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ORIGINAL ARTICLES.

GASTRO-ENTEROSTOMY WITH RAWHIDE AND SEGMENTED RUBBER PLATES.

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GASTRO-ENTEROSTOMY is an operation to establish a permanent fistula between the stomach and some part of the intestine. The term is a generic one, and under it may be included gastro-duodenostomy, gastro-jejunostomy, gastro-ileostomy, and gastro-colostomy. It signifies a communication of the cavity of the stomach with the lumen of the intestine through their respective contiguous walls, and is simply gastro-intestinal anastomosis.

The object of the operation is to overcome an obstruction, malignant or non-malignant, in the pylorus or in any part of the intestinal canal that can be excluded by the anastomosis. The advantage of gastro-enterostomy is that by means of it no structure need be removed. None of the functions of the digestive tract are destroyed in the operation, since physiologically the gut is only partially excluded. All the glands, nerves, bloodvessels, and lymphatics in the excluded intestine can perform their duty in the natural way, as the secretions of the mucous membrane can escape in both directions, and still aid in digestion. In short, gastro-enterostomy permits the contents of the stomach to pass into a new channel with the least possible disturbance. As a surgical procedure this operation possesses all known advantages—no important bloodvessel is cut, no vital function is destroyed, and no great nerve-plexus is injured, and it has the prime essential of all intestinal operations—it is short in duration. It may be considered a successful rival and substitute for pylorectomy. As the operation is a much less serious procedure than pylorectomy, it will have a greater field of usefulness, and will be oftener employed. In gastric cancer it has the great advantage of prolonging life with little or no suffering. It does this by putting the diseased parts in a state of rest. The disadvantage of gastro-enterostomy is also obvious—that is, it does not remove the disease. Whether the tumor be a slow-growing, non-malignant neoplasm, or the erratic proliferation of the malignant cell, gastro-enterostomy does not in the least interfere with the growth; hence, whatever the disease may be, it continues after the operation as

before, except that it is not irritated by the passage of the contents of the stomach. It would be a disadvantage to a patient to do this operation for a non-malignant stricture of the pylorus if the stricture could be successfully dilated, for the natural channel is better than an artificial one. An artificial channel does not have a perfect sphincter, is liable to contractions and dilatations, and hence does not regulate the passage of the contents of the stomach.

When gastro-enterostomy has been done, it is difficult to obliterate the artificial fistula. When the dangerous pylorectomy is done it removes, as far as possible, the offending growth, and thus may prolong life; but the close proximity to vital organs, the difficulty of its execution, the prolonged exposure of the abdominal viscera, and the manipulations of great nerve-plexuses, all induce profound shock which endangers life. I saw the skilled surgeon, Professor Billroth, tie the portal vein by mistake while doing a pylorectomy, and thus cause the death of his patient. It may be stated in general that gastro-enterostomy has not fully satisfied the expectations of the profession, but that the surgeon who pays particular attention to the operation will not be very much disappointed. Careful observation clearly shows that the operation has not been done on very favorable subjects, and that the disease killed the patients while the operation benefited them. After the operation the patient suffers less, is more useful to himself and less of a burden to his fellows until his death, which is inevitable. Some patients are now alive several years after the operation.

So far as I have been able to ascertain, the operation of gastro-enterostomy has been performed upon man about 140 times, although some of these may be duplicate cases.

The operation was first performed in Vienna by Dr. Wölfler in 1881. He began the operation of pylorectomy, but being unable to complete it on account of the conditions, did a gastro-enterostomy to obviate the trouble. A hole was cut into the stomach and one into the gut, and the margins of the wound were united by the Czerny-Lembert stitch. The patient lived four months. Since that time Billroth, Lauenstein, Senn, Borker, Rydygier, Page, Hahn, Czerny, Luecke, Küster, Winslow, Stamm, Posteniski, Ransohoff, Monastyrski, Rocowitz, and others have performed the operation. The most numerous and favorable reports of cases of gastro-enterostomy come from Professor

Luecke, of Strasburg, who with eight operations had seven recoveries.

The last report of Professor Billroth's that I have seen contained eight cases with three recoveries and five deaths. Professor Czerny reported in 1870 that he had done eleven gastro-enterostomies in his clinic with the following results: three died of septicæmia, four died of progressive marasmus or pneumonia in from two to four weeks after the operation, and four were benefited by the operation. At the same time he reported twelve cases of pylorotomy, of which eight recovered and four died. The medical world has long looked upon Professors Billroth and Czerny as the great advocates of pylorotomy, and hence it would be natural to expect equally authoritative and reliable results from this closely-related operation, gastro-enterostomy. Professor Czerny assisted Professor Billroth for several years in the clinic at Vienna, so that the work of these two men is similar. I know from visits to Professor Czerny's clinic in 1883 and Professor Billroth's in 1887, that their work represents the greatest skill, yet their results in these operations are not very flattering. I am convinced that this is chiefly due to late operations on unfavorable cases. It is reported, though I cannot show statistics, that Professor Senn's results have been more favorable. This I think is due to the fact that Professor Senn operates earlier in the course of the disease than is done in the clinics mentioned. Dr. Senn's wide experience in intestinal operations gives him skill and rapid execution—prime factors in gastro-enterostomy. However, the operation must be judged by the kind of cases upon which it is employed, and not merely by death-statistics. The results of gastro-enterostomy are on trial in every country. The final effects on life must be determined by the observation of many cases through a number of years of carefully-recorded work. Brilliant single cases, by good specialists, should not blind us to the generally-observed effects. Extended clinical research is the only mode of arriving at a conclusion upon the subject.

Two results of the operation are to be expected: one is the relief of suffering; the other, the ultimate cure of the obstruction by directing a part or all of the contents of the stomach into an artificial channel. In general it accomplishes these objects well.

By the old method which Dr. Wölfler employed, gastro-enterostomy was, in my opinion, an unsafe operation. Its dangers lay in the length of time required to perform it and also in the yielding of the sutures; moreover, insufficient rest was given during repair of the wounds, due to non-fixation of the parts. The fistula is not held patent by the old method, while the plates now in use keep the fistula

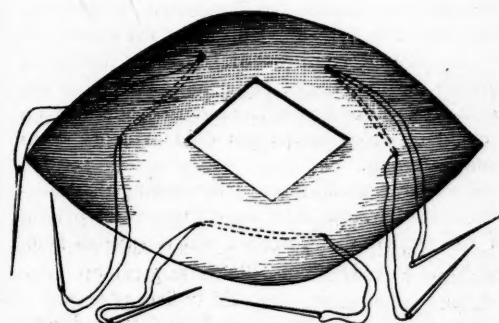
open, thus insuring a lumen large enough for free communication between the stomach and intestine. Experiments taught me some valuable lessons in this work, and by the liberal use of dogs I soon learned to avoid a number of errors. The experiments convinced me that the anastomoses should be made at the most dependent portion of the stomach in order that the food may escape from the stomach with greatest ease. If the anastomosis is made between the gut and the highest part of the stomach, or along the lesser curvature, or even midway up the organ, the animal suffers more or less until all food is expelled from the stomach. By anastomosing the lowest portion of the stomach to the bowel, the artificial fistula is kept sufficiently patulous to prevent obstruction.

The fistula is kept open mainly by the passage of food, flatus, and secretions, and when plates are used they aid in keeping it patent. The operation can be done with the ring and plates in thirty minutes, making it a safe and reliable surgical procedure. When we consider that thirty-five per cent. of *all* cancers attack the stomach, and that of gastric cancers sixty per cent. begin in the pylorus, the supreme importance of the operation is apparent. It seems reasonable that gastro-enterostomy should be substituted for pylorotomy in cancer of the pylorus, for autopsies demonstrate that one-fourth of pyloric carcinomas show secondary deposits in the liver. In such cases pylorotomy is almost useless, while the safer and more easily performed gastro-enterostomy will relieve indescribable suffering until the inevitable end. Even in non-malignant neoplasm, and in stenosis and occlusion of the pylorus, gastro-enterostomy has all the advantages of pylorotomy, besides producing less shock and violence to the system.

It required three years of experimentation to discover the proper material for the plates. In 1889 I began to use cartilage from the scapula of a heifer. At that time I had never heard or read of cartilage plates being employed for this purpose. I abandoned the cartilage plates in a short time, however, as they were absorbed too quickly when thin, and were too clumsy when thick. Some dogs died because of the too rapid absorption of the plates. Various forms of leather were then tried, as the reports of the experiments will show. Finally, I adopted rawhide, and the success of this material in gastro-enterostomy, as well as in many other operations, demonstrates that it is a proper material for securing an anastomosis in the alimentary canal. It is absorbed slowly, and causes coaptation of the large serous surface, producing complete fixation and rest of the parts—essentials for prompt and efficient healing. The rawhide plate is made by shaving the hair from the "green" hide of an ox, and cut-

ting it in strips an inch wide and two and one-half inches long. A diamond-shaped hole one-half by three-fourth inches is then made in the centre. From four to six sutures armed with needles are attached to the plate, and it is ready for use. I used linen thread and ordinary round sewing needles. The thread should be kept in carbolized water or alcohol. The plates can be used either dry or green. Any degree

FIG. 1.



Rawhide plate.

of thickness and hardness may be secured in drying the green hide. The size and rapidity of absorption of these plates can be adapted to the character and quality of the intestinal tract. I secured better results from the use of six than from four sutures. The death of a few dogs induces me to say that in intestinal anastomosis it is not wise to penetrate the incised gut-wall too far from its margin with the needle, as a fecal fistula is apt to be produced.

Practical examples are always superior to theoretical precept, and so in this paper I will present practical work to demonstrate the operation, technique, material used, and the clinical and pathological conditions and results. The experiments consisted of ten gastro-enterostomies upon dogs with nine recoveries. The wounds were not dressed and the dogs lived together in a cellar.

EXPERIMENT No. 24.—Dog, female, weight twelve pounds. Animal chloroformed, belly shaved, and a loop of small intestine was drawn out through a three-inch median incision in the abdominal wall. An incision one inch in length was made in the convex border of the intestine, and a perforated sole-leather plate (one, by two and one-half inches) was inserted into the lumen of the bowel. The plate had four sutures attached to it, the lateral ones being armed with needles. The needles were passed from the inside of the gut outward about one-third of an inch from the margin of the wound, penetrating the thickness of the bowel wall. The index and the middle fingers were then introduced into the abdomen and a fold of the stomach drawn out, when another plate was introduced in a similar manner

into the stomach. The stomach-plate and the incision were larger, and the needles penetrated the wall further from the margin of the stomach than in the previous operation. The serous surface over the plates was then scarified and the plates brought together, the corresponding sutures were tied, first the lowest lateral, then the two end ones, and finally the upper lateral, which brought together accurately the two incised wounds of the stomach and bowel. Just before tying the plates together the serous surfaces between them were sutured by a continuous Lembert stitch. A graft of unsevered omentum was applied closely around the anastomosis and sutured in position. The abdomen was closed by stitches one-third of an inch apart, including skin, muscles, fascia, and peritoneum. The dog made an uninterrupted recovery.

Seventeen days afterward the animal was killed by chloroform and the autopsy revealed the peritoneal cavity perfectly healthy, except a little cicatricial tissue immediately around the anastomosis due to local peritonitis. The graft was firmly adherent to the parts, enclosing the anastomosis in a strong sheath secure against perforation. The union between the surface of the anastomosed parts and the graft was complete, the results of proliferation of connective-tissue cells, bloodvessels, lymphatics, and nerves. Separation of the graft and serous surface was impossible, as it was completely adherent. The anastomosis was made five feet from the pylorus. The plates were in the same condition as when put in, with the exception of a slight softening, and the one in the stomach had commenced to dissolve. They had caused no ulceration by pressure. In seventeen days the fistula between the stomach and bowel had healed and a sphincter-like opening existed which freely admitted the thumb. There was considerable new tissue around its margin. The plates, linen, and sutures were still in position. Upon injecting water into the stomach nearly all of it passed through the artificial fistula. A bunch of straw had collected on the proximal side of the plates, but allowed the passage of food. Almost no food passed through the isolated bowel. It did not appear so vascular and was contracted. My observation is that the excluded membrane at first reacts and becomes congested and red, and later becomes pale. Of course the redness is more apparent, because the membrane is not stained by bile passing over it. The dog lost somewhat in weight.

Remarks.—The stomach-plate would have been absorbed and the intestinal-plate would have passed per rectum had the dog been allowed to live. Sole-leather, however, is not a good material for intestinal anastomosis. Such a dog fed on soft food will have no obstruction for months, at least. But if allowed to roam about, enteroliths will form on the proximal side and cause dangerous obstruction. The straw, bones, and shreds of food become entwined around the plates and will sometimes enlarge the artificial fistula to almost three times its original size. Practical experience teaches me that the artificial opening will contract to one-third or three-

fourths of its original size, and hence the incision must be made large enough to allow contraction. Linen thread does just as well as silk for this purpose.

EXPERIMENT No. 26.—Operation was performed as in Experiment 24, and the dog was killed eighteen days after the operation. The abdominal viscera were healthy. The anastomosis was completely healed and the contents of the stomach had been passing through the new channel. The fistula easily admitted the thumb. It had contracted to one-third of its original size. The plates were still in position. Water injected into the stomach escaped almost entirely through the new channel. The excluded bowel was pale, contracted, and slightly stained with bile. The anastomosis was made three feet below the pylorus. The omental graft had formed firm adhesions. Adhesions had formed between the stomach and the ascending colon at a point just above the cæcum.

Remarks.—Sole-leather plates must be abandoned on account of their insolubility. The omental graft should be severed. All raw places in the abdominal cavity should be covered by peritoneal grafts, as bands of adhesions are apt to arise, which may catch and strangulate the intestines. Both operations demonstrate that faecal accumulation will not occur in the excluded bowel, and that the opposition once raised in the French Academy of Medicine against gastro-enterostomy on account of this supposed accident is groundless. The faeces will take the direction of least resistance. The operation was completed in about thirty minutes, and the shock was not great. It seems that in three weeks the fistula had developed a kind of sphincter, due to the periodical dilatation and contraction caused by the irregular passage of the contents of the stomach and flatus. Pressure of the rings on the mucous membrane had caused no ulceration.

EXPERIMENT No. 28.—Dog, male, weight twenty pounds. This operation was conducted in the same manner as were the previous cases, with the exception that rawhide plates were used instead of the sole-leather ones. The dog made an uninterrupted recovery, and was killed on the eighteenth day after the operation. The abdominal organs were healthy. The omental graft had formed strong adhesions, the anastomosis was well established, and water injected into the stomach passed equally well through the new and old channel. The artificial fistula had contracted to about one-half of its original size, being sufficiently large to admit the index finger. The plates were entirely removed; two threads yet remained. The fistula felt and looked like a natural sphincter. In approaching the stomach the great omentum was torn through instead of being pushed to the left. About seven feet of small intestine had slipped through this aperture. This teaches us to avoid making such openings, or in case they are made, to suture them. They would, no doubt, strangulate the intestines if they remained open.

Remarks.—I do not know that rawhide has ever been used in anastomosis in man, but I have demonstrated by many experiments that it is an excellent material for this purpose. The plates never fail to be absorbed in the stomach or upper part of the intestine and if free from tannin they will be absorbed at any point in the alimentary canal.

By mistake I excluded four feet of small intestine in Experiment 28, but the excluded bowel was free from faecal accumulation and had become atrophied. The advice of Luecke and Lauenstein, to seize the first loop of bowel which appears at the abdominal opening, should be discarded. It is not justifiable, because the loop might be in the lower end of the ileum—a mistake which Lauenstein made, and on account of which his patient died in a few weeks from marasmus.

The duodenum is reached by pushing the omentum to the left, and then searching for the pylorus or the end of the pancreas, which serve as landmarks for this part of the intestine.

EXPERIMENT No. 34.—Dog, male, weight twenty pounds. Operation performed in the same manner as before, rawhide plates being again used. Dog made a good recovery, and was killed in eleven days. The abdominal organs were healthy. I had intended to anastomose the transverse colon with the stomach, but the autopsy showed that the rectum was united to the stomach, hence, the alimentary canal consisted of the stomach and part of the rectum. The stomach had been dilated to one-fifth larger than normal, by the constant dragging upon it. When water was poured into the stomach it all passed through the artificial opening. The fistula felt like a sphincter, and admitted the index-finger. It had contracted to one-half of the original size. Though nearly all of the bowel was excluded, the dog had neither marasmus nor faecal accumulation. The plates were entirely absorbed.

Remarks.—The mistake of seizing the rectum for the transverse colon should be remembered. Evagination, however, is the only proper method of accurately locating the parts to be anastomosed. The bowel should be passed through the fingers and carefully inspected. This experiment demonstrates that rawhide is a proper material for use in gastro-enterostomy.

EXPERIMENT No. 36.—Dog, female, weight thirty pounds. I had performed a splenectomy seventy-nine days previously to this operation, and had extirpated the cæcum thirty-five days previously to the gastro-enterostomy. Rawhide plates were introduced and secured by six ligatures. The dog recovered from the operation and ate voraciously, but died on the fifteenth day from marasmus. She lost considerable flesh from the first operation, much from the second, and more from the third.

The autopsy showed that each wound was completely healed. The plates were entirely absorbed. The anastomosis was well established and the artificial fistula was contracted to one-half of its original size and had a sphincter-like appearance, admitting the little finger. The stomach was attached to the jejunum two feet from the pylorus. Scarcely a vestige of fat could be seen in the dog. The peritoneal graft that was applied to the anastomosis had thrown out a wall of exudate which completely sealed the wound and held the parts firmly in place. All that remained of the spleen was a contracted cicatrix. Nothing remained in the place of the extirpated cæcum except a few scars.

EXPERIMENT No. 39.—Dog, male, weight twenty-five pounds. The material used in this operation was segmented rubber rings armed with six sutures and six needles, the tubes being held together by four strands of green rawhide. The rings were introduced into the bowel and stomach in the same manner as the plates. The animal completely recovered and was killed eight days after the operation. It lost four pounds in this time from marasmus. The abdominal organs healthy; bands and adhesions existed. The rings were gone and the anastomosis was perfect. Water passed equally well through the natural and artificial channel. The omental graft, three by four inches in size, was torn from the part of the omentum which lay over the stomach, but had firmly adhered to the parts. A curious accident, similar to the one mentioned in a previous experiment, occurred after this operation. Eight feet of the small intestine had protruded through the aperture in the great omentum and were tightly held by the constricting band.

Remarks.—This accident teaches us that either the graft should be taken from the edge of the omentum, or that the omental aperture should be resutured.

EXPERIMENT No. 50.—Dog, male, weight twenty pounds. Rawhide was used in this operation. The animal made an uninterrupted recovery and was killed in seven days. The omental graft was firmly adherent. The stomach plate had completely disappeared and the intestinal plate was about one-fourth absorbed. These plates were made of rawhide belt-leather, which contained considerable tannin. The anastomosis had completely healed, and the passage of the stomach contents through the new channel was well established. The fistula was contracted to one-third of its original size. Two feet of bowel were excluded. The omentum was found attached to the median abdominal incision.

EXPERIMENT No. 52.—Dog, male, weight twenty pounds. The material used for this operation was green rawhide from which the hair had been shaved. The plates were armed with the usual number of sutures. The opening in the intestine was one inch, and that in the stomach one and a half inches in diameter. The serous surfaces over the plates were well scarified, and the plates carefully tied together. An omental graft was applied and held in position by sutures. (The plates should always be put in the convex side of the bowel.) The dog

made an uninterrupted recovery. He was killed eight days after the operation. The abdominal organs appeared healthy; the healing of the anastomosis was perfect and the omental graft was firmly adherent. As far as we could ascertain, all of the contents of the stomach had been passing by the new channel. The opening had contracted to one-half of its original size, and was in a firm sphincter-like condition. The anastomosis was made three feet below the pylorus.

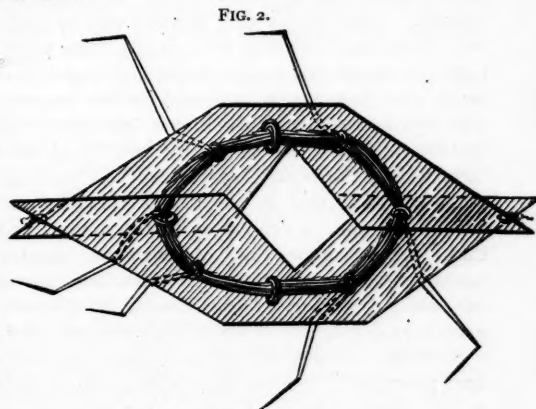
EXPERIMENT No. 21.—Dog, male, weight thirty-five pounds. The same material was used in this as in the previous experiment. The dog died in fifty hours, from a faecal fistula at the site of the plate. The stomach-plate was about one-fourth absorbed, and nearly all of the absorption had taken place at the pyloric end. The intestinal plate was softened, but not absorbed. The omental graft had healed well, except at the point of septic infection.

Remarks.—I think the result might have been different had I secured the plate in position with six instead of four sutures.

For the past eight months I have been using other kinds of plates for intestinal anastomosis, hoping that I might discover a still better material than rawhide, though it had proved so far almost a perfect success. I wished to secure something that is cheaper and more easily prepared than rawhide.

After considerable investigation I discovered that segments of thin flat rubber and a ring of rawhide make the best plates that I have yet tried.

I have used rings of sheepskin and catgut instead of the rawhide, but find that one is just as good as the other.



Segmented rubber plate.

I have called this new plate the segmented rubber plate. It is made of rubber bands, which should be from two and a half to three inches long, three-quarters of an inch wide, and about one-twelfth of an inch thick. Very thin rubber is best, a piece of an Esmarch bandage being sufficient. The corners of the rubber are clipped off from one side of each seg-

ment, and a triangular piece is cut out of the opposite side of the segments to allow of a channel for the passage of feces. The rubber segments should then be stitched together at each end with catgut. After making a ring of rawhide, catgut, or sheepskin, it should be stitched to the sides of the rubber plate with two catgut sutures; thus the rubber plate and ring are held together by catgut only. Now apply the six sutures armed with round needles and the plate is ready for use. Dr. Matas, of New Orleans, kindly sent me his solid catgut ring, which he thinks is a good ring to apply to my segmented rubber plate. Its principle is about the same as the ring of rawhide that I used a year ago.

The claim I make for this segmented rubber plate is that it has been successful in my experiments, that it is easily made, and it is absorbed in the proper length of time. It is superior to a ring, as all plates are. It brings into coaptation the largest amount of serous surfaces and holds them closely together.

The plate produces uniform pressure in all directions. There are no uneven surfaces to cause gangrene or sloughing of the gut, which would produce fecal fistula. The plate produces the most perfect fixation of the parts and allows healing to go on. An essential in these operations is fixation for a certain length of time, as one cannot rely on a definite time for the appearance of plastic exudate. This exudate may be thrown out in a few hours or be delayed more than twenty-four hours. It is exceedingly variable in quantity, and the parts require close approximation so as to prevent leakage. After about one hundred and seventy-five operations extending over nearly three years, I am convinced that a plate should not be absorbed for at least four or five days, and for this reason I abandoned cartilage, which was absorbed too quickly. Some of the dogs died from fecal fistulae caused by too rapid absorption of the cartilage plate. I know that in some cases complications have arisen after a coaptation of three days, and thus I put the proper limit of continuous approximation at from four to five days. The rubber plates can easily be made to last a week by properly selecting the material of which they are composed.

Since the introduction of these plates two errors have prevailed. The first error is that rubber which is too heavy is used. I sent a pair of plates by request to a surgeon who wrote that he supposed I had sent him a *model* of the rubber plate, as he considered the rubber bands attached to the plate too light for use.

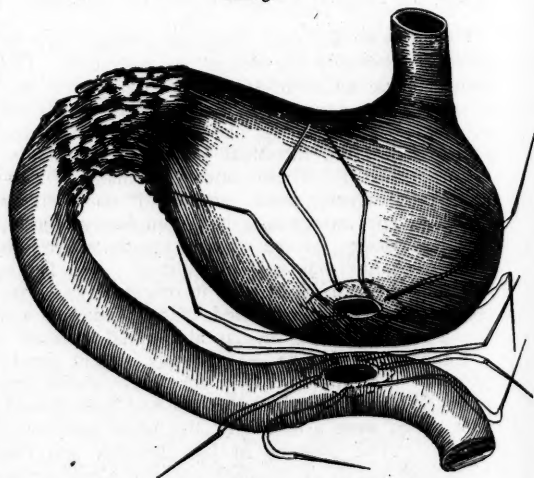
Heavy rubber will cause gangrene of the gut by its constant elastic pressure. The rubber plate is simply to exert the pressure uniformly in all directions, otherwise Dr. Matas's solid catgut ring, Dr.

Brokaw's segmented rubber ring, the author's rawhide ring, or Davis's catgut mats would be just as good. But no ring is as useful as a plate, and no plates, are as cheap and easily made as the rawhide or segmented rubber plate. I have had the greatest success with rubber bands, of which eighteen placed against one another make a plate about an inch thick. Hence the rubber bands composing the plate should be from one-twentieth to one-twelfth of an inch thick.

The other equally erroneous impression is in regard to the size of the holes in the plate through which the needles are passed. Six of these holes are punched in the plate, and should be about one-eighth of an inch in diameter or about the size of a crow quill. The purpose of these large holes is to allow the knots and the undissolved part of the ring to become easily disengaged from the plate, as they would aid in producing an obstruction if retained. It must be remembered that if a knot catches in the rubber it will remain in that position until it sloughs through the edge of the artificial fistula, and I have had such threads remain in the edges of the fistula for more than fifty days. Hence, for this reason use thin rubber and make large round holes in the plates. Let me reiterate that the artificial fistula should be made large, for it will generally contract from one-fifth to one-half of its original size; scarify without exception, and always apply an omental graft over the anastomosis.

I have used the segmented rubber plates in many experiments and will report one case of gastro-enterostomy to illustrate the technique.

FIG. 3.



Plates in situ. Ligatures ready to tie.

EXPERIMENT No. 153.—Dog, male, weight twenty pounds. A segmented rubber plate was inserted

into an incision in the stomach one and a half inches in length, and the six needles passed from within outward, penetrating the entire wall of the stomach about one-third of an inch from the margin of the wound. A loop of the small intestine was then withdrawn from the abdominal opening and an incision one inch in length made eighteen inches below the pylorus, into which a segmented plate was inserted. (Fig. 3.)

The two serous surfaces over the plates were scarified and the plates brought into close apposition.

An unsevered omental graft was applied over the seat of operation and fixed in position by a few fine sutures. The recovery of this dog was remarkable, but on the eleventh day after the operation he escaped and we never saw him again. He actually gained flesh during the ten days of his confinement.

It may be said that there is only slight shock succeeding this operation when it is rapidly and skilfully done with plates and the abdominal viscera manipulated as little as possible. In one case the dog nearly died three times during the operation, simply from the dragging on the stomach. No doubt much of the shock in these cases is caused by exposure of the viscera to a lower temperature and the manipulation of the parts.

I wish here to thank Mr. Ame Zetlitz and Dr. C. S. Miller for their able and kind assistance during the past year. Dr. Gillette also aided in some of the experiments.

A CONTRIBUTION TO THE STUDY OF THE COMPLICATIONS OF ACUTE OTITIS MEDIA.¹

BY H. V. WÜRDEMANN, M.D.,
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The following case exhibits an unusual number and an alarming severity of those complications which occasionally accompany otitis media, but which are somewhat rare in the course of acute inflammation:

A. M., a painter, aged fifty years, had an attack of epidemic influenza two weeks before he came under my care, which was followed by severe ear symptoms on the left side. The drum-membrane ruptured six days afterward, and great relief from the pain was experienced. The patient had no medical attendance until this time, when his family physician was called, and the case was sent to me for treatment of the ear. The patient's temperature was 101°, and there was great pain over the scalp and shoulder of the left side, with profuse discharge from the meatus. In short, all the usual symptoms of acute suppuration of the ear were present in an exaggerated form. The next day the mastoid area of the left side was red, tender, and somewhat swollen. He complained of visual disturbance, which proved, upon examination, to be

left lateral hæmianopsia. The visual field was taken by the fingers at this and at each subsequent examination. *Muscae volitantes* also annoyed the patient.

Several attacks of epistaxis of alarming severity occurred during the night. The fever was at times interrupted by chills, and excruciating headache helped to make the patient's condition most deplorable. Phlebitis of the brain sinuses was suspected, and the symptoms pointed to inflammation of the cavernus sinus.¹

In the course of a few days, under the use of antiphlogistic treatment, these alarming symptoms disappeared, although the pain was at times so intense as to require morphine for its relief. The pain was limited to the left side of the head and extended over the entire distribution of the fifth nerve. All the teeth of the upper jaw of the left side ached.

One week later an inflammation of the external auditory meatus set in, which required the use of leeches and incisions for its relief. In the beginning of the third week a sequestrum of bone seven mm. in length and three mm. in width at its widest part came away in the discharge. The locality from which it came could not be recognized, either from examination of the specimen or from inspection of the tympanum. The discharge was very slight and the perforation in the drum-membrane appeared to be closing. The patient had been steadily growing more deaf upon this side, and in the beginning of the fourth week he complained greatly of increased tinnitus and marked dizziness. At this time another sequestrum was removed by forceps, it having been found to be loose. A few days later no pus was observed in the meatus. The patient was not seen again for about a month, when he returned with the meatus full of pus. He stated that the ear had been dry until a day or two before. This discharge ceased in several days under the ordinary antiseptic treatment.

Two months from the date upon which he was first seen he consulted me, complaining of great pain in the head and of excessive dizziness. He was "flighty" in language, but managed to inform me that he had fallen several times on the way to my office, which was but three squares from his residence. He had been absolutely deaf on the left side for some time. I advised him to return at once to his home. On leaving my office he wandered mechanically down town, where he was arrested as "drunk" by an intelligent policeman and sent to the station-house. After a short detention his condition was recognized to be the result of sickness and not of alcohol, and he was turned loose on the street, to make his way home as best he might, as he claimed to know the way. After four hours' exposure he at length reached home, having fallen a number of times on the way. I was called to see him that night, and found him in bed with delirium and high temperature. In consultation with Dr. William Mackie, meningitis was determined to be the cause of these symptoms. The patient fully recovered from this trouble, after a tedious convalescence. Absolute

¹ Read before the Northwestern Wisconsin Medical Society, at Wausau, September 8, 1890.

¹ Politzer: *Ohrenheilkunde*, p. 376, ed. 1887.

deafness has continued, no assistance being rendered by artificial aids. The tinnitus aurium has disappeared entirely, but the vertigo at the present writing, nine months from the inception of the disease, is as pronounced as ever. The patient in walking can prevent himself from falling to the left only by a strong effort at each step. There has been no discharge from the ear for six months, and for four months the membrana tympani has been completely restored.

There has been an entire destruction of the auditory apparatus of the left side.

MEDICAL CASES IN THE COURTS.

BY HENRY A. RILEY, ESQ.,
OF NEW YORK.

THE State of Kansas is old enough, it seems, for cases involving the perpetuity of cemeteries to get into the courts. In a recent case it was claimed that the donors of the land had rights which were not extinguished when the cemetery was dedicated, and that, under certain circumstances, they could claim a reversion of the land and the right to the use of it in the meantime. The judgment of the court is interesting, and we quote as follows: "In the case at bar the donors have devoted the whole use of this land for the purpose of continuous burials and as a place for the repose and memory of the dead. In my judgment no conceivable right of private beneficial enjoyment would remain in the donors, as owners of the fee, which would not be inconsistent with the right of sepulture to which they have devoted it. Crops for their gain and sustenance could not be grown upon its surface, nor could dwellings for their shelter and enjoyment be erected within its limits, without interfering with the solemn use, the sanctity and repose, implied in the purpose of the dedication. The sunshine and laughter of inhabited dwellings, as well as the 'toil and endeavor' of business pursuits, are out of place in cemeteries of the dead.

"According to our law governing the subject of ejectment, the plaintiff cannot prevail unless he has the immediate right of possession at the commencement of his action.

"As long as the rights of sepulture parted with in the donation are outstanding in the public the plaintiffs have no right to recover the use of the land for any enjoyment or purpose of their own."

Hon. Henry Hitchcock, President of the American Bar Association, gave, at the meeting held this year, a detailed statement of legislation during the previous twelve months in the different States, which is of much value to any one desiring to observe the drift of lawmaking.

The meeting was held some months ago, but the information will not seem stale even at this late date.

On the subject of the public health Mr. Hitchcock gives the following interesting statement: "The care of public health is a subject of various statutes in twelve States. New Jersey, Washington, and North Dakota created State Boards of Medical Examiners, without a license from whom no person may lawfully practise medicine, and a license may be refused or revoked for unprofessional or immoral conduct, and in North Dakota 'for publicly advertising special ability to treat or to cure diseases, which, in the opinion of said board, it is impossible to cure,' though an appeal to the Governor is permitted.

"Another act of North Dakota, while recognizing the needs of anatomical science, imposes wise and humane restrictions upon its votaries. Kentucky, by an amendatory act, transfers the licensing power from the faculties of legally-chartered medical schools and the State Board of Health, but forbids any travelling empiric to register or practise medicine within the State.

"As indicating the progress of public sentiment, I recall, with some amusement, a conversation ten or fifteen years ago with a legislator in another State, who indignantly refused to support a similar statute on the ground that if a free American citizen chose to consult a quack doctor, it was nobody's affair but his own; but that State has now, for years, required physicians and surgeons, dentists and druggists alike to be registered and licensed by the State Board of Health. A like growth of public sentiment in another direction is indicated, and the old maxim, 'that prevention is better than cure,' is exemplified by a New Jersey statute authorizing the incorporation, by certificate, of associations for promoting the interests of cycling and athletic sports. New Jersey also enlarges the powers of township boards of health, making further provision against danger from epidemics or contagious diseases in public and private schools.

"New Jersey, Virginia, and North Dakota also forbid the practice of dentistry without previous examination, and license from the State Board of Dental Examiners.

"The sale of drugs is regulated, and their adulteration is made a criminal offence by amendatory or original statutes in Georgia, New Hampshire, New Jersey, North Dakota, Rhode Island, Ohio, and South Dakota; in all of which States it is unlawful for any but a registered and licensed pharmacist to sell drugs, and severe penalties are imposed for their adulteration. In Georgia every manufacturer or vendor of drugs must, on demand by any person interested, furnish a sample for analysis to the State Board of Pharmacy, who are required to prosecute in case of adulteration. Ohio declares what shall be the standard of drugs for purity, and what con-

stitutes the adulteration of food. In New Jersey a vendor of adulterated drugs may defend by showing that he procured them in good faith from a resident of the State, with warranty in a form prescribed—the giving of a false warranty being also a misdemeanor."

The microbes, in their devastating course, have entered the State of Texas, and the Supreme Court of that State has been called on to decide whether a manufacturer, who calls his compound "Microbe Killer," can prevent a rival manufacturer from calling his panacea "Microbe Destroyer." The first designation was placed on a yellow label with a black border, while the second was printed on a white label with a red border, and, in addition, had a pleasing representation of a man striking a skeleton with a club. The court, after ample deliberation, decided that it could not interfere, and that there was no violation of the trade-mark laws.

OPEN DIVISION IN STRANGULATED INGUINAL HERNIA.

BY BENJAMIN T. SHIMWELL, M.D.,
DEMONSTRATOR OF SURGERY IN THE MEDICO-CHIRURGICAL COLLEGE,
PHILADELPHIA.

The classical operation for strangulated inguinal hernia has only partly met the requirements. The advance made in surgery, more especially in that of the abdomen, has allowed a greater liberty of action, which seems not to have been properly taken advantage of in the treatment of this condition.

This paper is written to show the advantage gained by the open method of operating—that is, cutting directly through all the tissues of the tumor, including the external ring, internal ring, and, if necessary, the abdominal wall, converting a simple herniotomy into a hernio-laparotomy.

The condition of the protruding gut is modified by its preëxisting condition, the size of the protrusion, the length of time of strangulation, and the position of the constriction. An old incarcerated hernia with a sudden increase of the protrusion and consequent constriction gives an abnormality in relation of structures and their component characters, that has no resemblance to an acute case and causes a difference in the ultimate results of treatment. The size of the protrusion is not so much a factor in causing constitutional symptoms as is supposed. I have seen as violent symptoms in a small protrusion as in one of greater size.

The length of time of constriction also modifies structural capacities, and directly influences the result.

The point of constriction may be either at the external or internal opening, or, what is often overlooked, the true constriction may be the neck of the peritoneal sac, the inguinal rings acting merely as a

barrier to the return of the gut and not as a true constrictor.

A careful consideration of these propositions opens a field of thought that must of necessity show the inefficiency of the nicking of the external ring from below.

The extension of the incision cannot be said to complicate matters by increasing the risks. It is settled beyond peradventure, that careful increase of a few inches in the length of an incision, whether in the abdomen or anywhere else, does not increase the risks.

Compare the old method with the certainty of work and view of field, the definite knowledge of conditions of the injured gut, and the lessening of risks which were due to handling of gut by the drawing down preparatory to reduction.

Would an abdominal surgeon operate in a case with marked adhesions through an opening of the same size that he would in a simple uncomplicated oöphorectomy? Working in the dark is prolific of bad results. It is not in the power of any man who operates for strangulated hernia by the old method to tell with certainty the condition of the bowel, and thus it is that many cases end in death by inflammation of, or ulceration and necrosis of the bowel at the point of constriction. The condition of the congested bowel is the point always to be regarded in determining whether it will regain its normal state. To me it seems that not enough importance is laid upon the condition of the tissue at the point of constriction. There is often an amount of injury done that causes the most serious results. There is the question of necrosis, which is one of importance, and then also the loss of nerve vitality by constant constriction, which is often marked. I have seen this persistent at the end of days, the obstruction still remaining.

Paralysis of a portion of the bowel prevents faecal circulation; the bowel forces its contents to this point, and then is unable to send them further. Gas and faecal matter will enter a paralyzed portion. Continuous action is a necessity. As a proof of this point, a patient upon whom I had performed hysterectomy died suddenly from tympany produced by obstruction of the bowels due to paralysis. The case was one in which every means were tried to relieve the condition.

The post-mortem examination discovered the point of paralysis in the lower portion of the ileum. The bowel walls were flaccid at this position for about two inches. Above this the whole canal was enormously distended, while below to the anus it was entirely empty. Experiments on dogs have shown the same results.

It is in the ability to appreciate these conditions properly that the open incision has its

strongest advantages. A full inspection of the injured bowel indicates the treatment where special conditions arise, as does the question of resection when gangrene is imminent, or in those cases in which it is apparent that the point of constriction will not regain its tone. The importance of resection in the latter cases has been impressed upon me by the condition of those that I have seen. This loss of tone is apt to be present in old incarcerated hernias, in which narrowing of the canal by pressure has altered the structure of the walls, and in such cases the increased constriction has injured an already impoverished part. Another advantage is the certainty of the complete return of the protruded gut into the abdomen.

The possibility of a radical cure is to be considered. I have one case that I operated on nearly two years ago, which seems to approach a radical cure. This was a case of true hernio-laparotomy. The internal ring was carefully sewn together, the floor of the inguinal canal was curetted and closed by buried sutures which included the external ring, the superficial surfaces continuous with the abdominal wall being brought together with silkworm-gut. The abdominal cavity was cut off at once and coaptation was so perfect that it tolerated the patient's tearing off all his dressings, walking down stairs and sitting on the front steps in the early morning of the fourth day. When I last saw him he was doing active work and was not wearing a truss.

The closing of the canal can be done, if so desired, by retention of the sac in the upper portion of the canal, using any of the methods suggested. In old incarcerated cases the adherent sac can be separated from the surrounding tissues, leaving a good surface for union, while the sac can still be retained at the internal ring, its serous surfaces simply in contact, or by the purse-string method. The open treatment, the value of which is still doubtful, can be tried.

If the abdominal walls have been divided, care must be exercised to bring into apposition the peritoneum and transversalis fascia, also the superficial fascias that make Poupart's ligament. The latter procedure is a necessity for strength, the sutures entering well into the pubic side to hold the divided ligament firmly together. If this is well done, when union has taken place the ligament can be readily defined and its relations are found to be continuous. Drainage of the pelvis is a necessity if exudation is apt to occur.

1253 SOUTH SEVENTEENTH ST.

Treatment of Acute Vomiting of Pregnancy.—The *Journal de Médecine de Paris* recommends five drops of a solution made up of equal parts of iodine and chloroform, to be taken at the time of eating by women suffering from the vomiting of pregnancy.

A CLINICAL STUDY OF ERGOT.

By JOHN C. HEMMETER, PH.D., M.B., M.D.,
OF BALTIMORE.

(Concluded from page 269.)

Few facts have been so well established clinically as the decided effect of ergot on hæmoptysis. Sparjani and Cabini have reported cases of pulmonary hæmorrhage that were almost instantaneously checked by this drug;¹ and Bazzani,² Jamieson,³ and Stewart⁴ have put on record a number of cases of hæmoptysis of an exaggerated type that ceased at once upon the hypodermic administration of ergot. This treatment has also found strong advocates in those excellent clinicians, Oppolzer⁵ and Thompson.⁶

We have taken the opportunity of testing the efficacy of secale in two cases of dysentery that proved rebellious to treatment with astringents, bismuth, opiates, and even to flushing of the large intestine. After the drug was persistently used the hæmorrhage ceased and recovery occurred. These cases presented no special clinical or physiological interest, except that it seemed that when the secale was injected through a long rectal tube, it had a more immediate and lasting effect than when given by the mouth or hypodermically. A strict milk diet was insisted upon during the entire treatment.

Successful results of the treatment of chronic diarrhoea by secale have been reported.⁷

O. Rosenbach has given secale a place in the therapy of aortic insufficiency and so-called idiopathic dilatation of the heart.⁸ As a consequence of the increased pressure of the hypertrophied ventricle, and under the influence of the increased quantity of blood which is thrown into the arteries, the latter are dilated and lose their contractility, so that a very important factor in the propulsion of blood is lost. Rosenbach claims to have obtained good results during the period of disturbed compensation by stimulating the aortic walls to greater activity. He has also used ergot in cases of arterio-sclerosis, in which, as he claims, the incapacity of the diseased portions of the arterial system must be compensated for by an increased activity of those portions that remain healthy. The benefit obtained was shown by the effects on the pulse, which became more regular and slower with a diminution of the attacks of dyspnoea and palpitation. The objections to Rosenbach's treatment are that

¹ *Annali Universali da Medecina*, 1880.

² *Ibid.*, February, 1881.

³ *Bull. Gén. de Thérapeutique*, 1871, t. lxxxi. p. 100.

⁴ *Edinburgh Med. and Surg. Journ.*, 1871, xvii. 511.

⁵ *Allgemeine Wiener med. Zeitung*, Bd. xxxiii.

⁶ *British Medical Journal*, September, 1872.

⁷ See Schmidt's *Jahrbücher*, December, 1871, and the *Lancet*, 1876, ii. p. 409.

⁸ *Berlin. klin. Wochenschrift*, Band ii., Abtheil 1, August, 1887.

dilatation of the heart may be the result, and not the cause, of increased peripheral resistance; that ergot in physiological doses increases endocardial pressure, which may have been the cause of the dilatation, and that in toxic doses it is a heart poison, or injures the ganglia. In disturbed compensation we are in many cases forced to conclude that the ganglia are at fault, and that the breaking down is nervous, not muscular.⁹ In one case of aortic insufficiency with marked Corrigan's pulse, Dr. Alan P. Smith, of Baltimore, and the writer witnessed marked improvement of the symptoms under ergot, after digitalis had failed. The aggravated symptoms in this case resulted from cerebral congestion; at times the patient was unable to see the window, and at her best complained of constant headache, giddiness, *muscæ volitantes*, and stabbing pains over the heart and extending down the left arm. The improvement lasted for six months, during which period the *secale* was repeated but once. At present, eight months after *secale* was first given, the patient is doing well. In a second case, one of mitral regurgitation, with a tendency to pulmonary engorgement and hæmorrhage, ergot proved a useful drug. There is one form of abnormal pulse which is, without exception, very much improved, if it does not disappear under *secale*—this is the dicrotic pulse. This pulse is caused by a very low degree of pressure in the arterial system, and a very short systole. In fever the elevated temperature causes a low arterial pressure, the vessels being dilated, the systolic contractions being too short and following each other too rapidly, constituting the conditions for dicrotism. Ergot fulfils all the requirements necessary to counteract these deviations from the normal. It increases arterial pressure, renders the systole slower, gives the vessels increased tonicity, and reduces the temperature.

We hoped to be able to present pulse-tracings and clinical charts from cases of meningitis and catarrhal pneumonia, showing the fall of temperature and reduction in number of the pulse-beats after hypodermic injections of ergotole in a case of meningitis, and also from a case of catarrhal pneumonia, showing slowing of the pulse-rate with increased tonicity and diminution of the number of respirations, but want of space forbids their insertion.

It is possible, by careful and long-continued ophthalmoscopic study of the fundus of the eyes of epileptic patients, to form an accurate conception of the dimensions of the vessels of the retina. The vessels can in fact be measured, if it becomes necessary, by an ophthalmometric attachment to the instrument. For these observations such patients

are best adapted who, in addition to epileptic seizures, present a more or less constant congestion and engorgement of one fundus, right or left, during the intervals between the attacks. When patients afflicted with *grand mal* complain of hemicrania during the intervals of rest and health, a careful ophthalmoscopic comparison of the two fundi should be made. If congestion is evident in one or both fundi, ergot should be tried, and should the drug produce its characteristic effect and the constriction of the arterioles and capillaries of the retina be evident after its administration (after 3 fluidrachms of fluid extract or 2 fluidrachms of ergotole have been given), the drug should by all means enter into the treatment of these particular cases. It should be borne in mind that the ophthalmoscopic study of the action of ergot should be made in the intervals between the seizures. We have made these statements on the basis of over two years' study of more than fifty epileptics at the Baltimore Insane Hospital. Among the symptoms that should direct attention to possible cerebral congestion are contracted pupil, hemiopia and diplopia, supra-orbital pain and narrowing of the field of vision, and aggravation of the symptoms by the recumbent position and acts involving deep inspiration, as blowing, sneezing, etc. The restriction of the visual field is often present on the side on which the hemicrania is complained of. In the cases of epilepsy that have been specified, combined treatment by bromides and ergot did not, it is true, cure a single case, but it greatly reduced the number of attacks, which is one step in the right direction. The records of epileptic attacks at the Baltimore Insane Hospital during the period referred to, were kept as carefully as possible by day and night nurses. The following is a tabulated statement of seizures occurring from April to September, 1886, inclusive, in four congestive epileptics, two males and two females. Under simple bromide treatment the number of attacks in these six months was 121. In the following six months the bromides were combined with ergot in the treatment of the same patients, and the number of attacks during this period was 31.

Table of epileptic seizures in four patients under simple bromide treatment at the Baltimore Insane Hospital, from April to September, 1886, inclusive:

	April.	May.	June.	July.	Aug.	Sept.	TOTAL.
Max R. . . .	6	4	6	7	8	5	36
Walter F. . . .	3	1	7	8	4	1	24
Dora Y. . . .	1	6	1	4	8	6	26
Rosa M. . . .	4	9	9	6	3	4	35

Table of epileptic seizures in four patients treated with a combination of bromides and ergot, from October, 1886, to March, 1887, inclusive:

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	TOTAL.
Max R. . . .	4	2	..	4	1	..	11
Walter F. . . .	1	1	2	..	2	..	6
Dora Y. . . .	1	2	1	4
Rosa M. . . .	2	3	..	3	2	..	10

¹ Osler: American System of Medicine, vol. iii. p. 629.

In our experience, cases of simple hemicrania, with the ophthalmoscopic appearances and other evidences of cerebral hyperæmia, have been relieved by the use of ergot without any other medication. In a case of migraine associated with a very irritable stomach, ergotole hypodermically gave gratifying results. In brief, whenever uncomplicated cerebral hyperæmia can be definitely discovered, ergot is the drug *par excellence*. In all cases of cerebral or spinal hyperæmia it is important to remember that ergot is a drug for the relief of acute symptoms only, and should not be long continued.

In the course of our studies upon ergot we have had the opportunity to observe its effects on three cases of posterior spinal sclerosis in which the symptoms became worse every time the drug was given and improved as soon as it was discontinued. One of the cases was at Bay View Hospital, the other two were in private practice. In a man aged forty-two years, who could walk fairly well and whose sight was good, who received ergot to relieve his lightning-pains, these pains became intolerable after the third drachm of fluid extract of *secale cornutum* had been taken. The patient often lost his equilibrium, and fell repeatedly from inability of coördination; a persistent nausea prevented further ingestion of the medicine, after which the man improved. On the following day we resumed the ergot, and the same symptoms were repeated, the patient even showing evidences of ptosis. Being convinced that the medicine was the cause of the trouble, it was discarded, and the case once more improved. About six months subsequently, the same patient, who had in the meantime consulted a northern specialist, returned with aggravated ataxic symptoms, ptosis, and evidences of mental alienation. He was taking a dark-red medicine, which we found, on writing to the druggist who had compounded it, to contain a half-drachm of fluid extract of ergot to the dose. This medicine was stopped, the man improving decidedly within a week, the ptosis disappearing.

The patient in Bay View Asylum had a typical iridoplegia, an Argyll-Robertson pupil, the belt sensation, and a paretic gait, but his cutaneous sensibility was not impaired, tingling and formication in the feet being the only sensory disturbances.

The patient had not complained of pain. After taking ergot (half-drachm of fluid extract three times daily) for one week he suffered from agonizing lancinating pains and a burning sensation over the sacrum. Movement of the lower extremities was almost impossible, and marked anæsthesia was found all over his legs. Incontinence of urine was present, and he also complained of seeing things double. These symptoms improved as soon as the *secale* was stopped, and returned with almost equal severity

four months later when he was again recommended to take it.

In a third case of locomotor ataxia similar aggravation of symptoms occurred under ergot; the symptoms were not, however, so severe, as the patient had learned to recognize the smell and taste of the fluid extract of ergot, which had formerly been given to him in drops, and refused to take it, asserting that it "always made him worse."

We are forced to the belief, from these observations and those of others that in spinal and cerebral diseases ergot is a dangerous agent to use if decided histological changes have occurred in the brain or cord. Benefit may be expected from it in only certain well-defined congestive epilepsies, in simple hyperæmia of the brain and cord, and in congestive hemicrania.

After carefully studying the literature of this question, we find that cases of locomotor ataxia have already been reported in which the symptoms were directly aggravated by the use of ergot.¹

From what we have learned concerning the damaging influence of this agent on general metabolism, and from the fact that its action is solely exerted, in a manner which cannot be experimentally established, by producing certain molecular, perhaps chemical, changes in the central nervous organs, we may argue that it should not be employed in acute myelitis, in acute spinal meningitis, in infantile spinal paralysis, or in posterior spinal sclerosis. In the psychoses it should find application only to relieve acute congestive symptoms, and then it sometimes works admirably. We cannot agree with writers who recommend ergot in sclerotic diseases, particularly in tabes. It is well known that this substance itself, when administered in large doses or for a long-continued period, can produce sclerosis of the cord. Spitzka² has seen a tabetic patient, advanced in the disease, who had received the drug for three weeks in such quantities that it was estimated that he had received more than some of the patients in whom Tuczek discovered the development of ergotin tabes. The proof of the existence of congestion and engorgement of the vessels at the onset of tabes has not been furnished; as a rule, the vessels are found sclerosed and narrowed. Spitzka points out that in the natural progress of tabes the lightning-like pains disappear, usually, about the time the anæsthesia becomes greater. The reason for this is supposed to be the destruction of the nerve-tubes whose previous irritation caused the pains. If, as is claimed, ergotin does produce amelioration of the lightning-like pains, it would be a damaging revelation to show that it does so in imitation of the natural process—that is, by increasing the sclerosis.

¹ See Centralblatt für Therapie, i. p. 227.

² American System of Medicine, vol. v. p. 901.

Ergot in diabetes mellitus.—It is not within the scope of this paper to dwell fully upon the pathology of glycosuria. This subject received much consideration at the last International Medical Congress,¹ where the debate concentrated the wide experience of such authorities as Pavy, Seegen, Dujardin-Beaumetz, de Renzi and Enrico Reale. An excellent summary of our present knowledge of the pathological anatomy of this disease has been furnished by Dr. Robert Saundby.² From the point of view of rational therapeutics it would be an important gain to have the various forms of diabetes classified more in accordance with their apparent etiological basis. We might thus distinguish cerebral, spinal, ganglionic, neurotic, salivary, pancreatic, duodenal, hepatic, and hæmatogenous diabetes mellitus. The hepatic form might be eliminated, because it seems probable that the liver is in no case either primarily affected or the primary cause of the disease. Section or paralysis of the vasomotor conducting paths from the centre to the liver is always followed by glycosuria. A number of hepatic nerve-fibres leave the cord high up and enter the sympathetic paths to the liver, and the disease has been observed to follow destruction of the upper cervical ganglion (Pavy), of the lower cervical and of the first thoracic ganglion³ of the abdominal ganglia (Klebs and Maunk), and also of the splanchnic nerve (Hensen and v. Graefe). As a consequence of destruction or paralysis of these structures there results vasomotor paralysis of the hepatic circulation. The expanded vessels engorge the liver with blood, which flows through the organ at low pressure and very slowly. This disturbance in the hepatic circulation causes an abundance of sugar formation in the liver, as the blood-ferment has ample time under these conditions to metamorphose the glycogen. Normally the vasomotor system of the liver is to be looked upon as exercising an inhibitory influence over the transformation of glycogen into sugar. The first four varieties, cerebral (Claude Bernard's puncture of the floor of the fourth ventricle), spinal, neurotic, and ganglionic all produce mellituria by causing the same changes in the liver; *i. e.*, vasomotor paralysis. It was to combat the hepatic engorgement that ergot was recommended in this form of diabetes. There are, however, other forms over which ergot cannot possibly have any kind of controlling influence. Lepine, of Lyons, has produced very plausible evidence that there is a form of diabetes which is due to a deficiency of the diastatic ferment in the blood. The following are his reasons:

1. The blood of a diabetic dog contains this ferment in much less quantity than the blood of a healthy dog.

2. Diastase injected in the dose of one grain into a diabetic dog diminished glycosuria.

3. Diastase injected in the same dose under the skin of a diabetic man diminished glycosuria.

Such a form of the disease as this might be termed hæmatogenous, as it depends upon some change in the composition of the blood. Ergot could, of course, exert no influence on this morbid change.

At the Tenth International Medical Congress Drs. de Renzi and Enrico Reale presented a joint communication on their experiments on diabetes, from which it appears that, experimentally at least, there are pancreatic, duodenal, and salivary forms of diabetes, as extirpation of the pancreas, duodenum, or salivary glands causes this disease. These observers also come to the conclusion that there exists in the organism a ferment occurring in varying amounts in the different organs, which ferment destroys sugar.

It appears that ergot is of no utility in pancreatic, salivary, duodenal, and hæmatogenous (absence from the blood of diastatic ferment) diabetes. We have records of two cases of well-marked diabetes in which ergot did not at all reduce the amount of sugar in the urine or the total quantity excreted; whereas the same cases improved as soon as the ergot was discontinued, and the patients were put upon opium and tinctura ferri chloridi. In both methods of treatment the patients were kept on a diabetic diet.

Addenda to experimental portion of this paper, published in THE MEDICAL NEWS, January 31 and February 7, 1891:

1. In studying the effects of ergot on blood-pressure, the drug, as was stated, was allowed to run into the jugular vein diluted with defibrinated blood. We omitted to state that defibrinated blood injected alone had no influence on blood-pressure.

2. A second series of experiments to obtain tracings of uterine contractions with the manometer failed for reasons already stated.

3. Under the head of causes of reduced temperature under ergot we omitted to refer to a possible effect on the glycogenic functions of the liver, which is one of the metabolic processes that raise the temperature of the blood. There are no experimental methods at our command to investigate this question.

4. In estimating the influence of ergot upon the rate of the blood-current, the amount of blood which flowed from a cut artery was first measured under natural conditions and then after the administration of ergot. The amount under ergot was less than the amount before it was injected. But the blood-pressure falls with the vital powers as an animal bleeds, and

¹ Transactions of the Tenth International Medical Congress, Berlin, 1890.

² Bradshaw Lecture, London, Aug. 1890.

³ Eckhard: Beiträge zur Anat. u. Physiol., 1877, viii. p. 79.

the reduction might be due to this and not to ergot. Upon Professor H. N. Martin's advice we then used the Ludwig Stromuhr. It was found after repeated experiments with the Stromuhr (testing the rate of the blood-current under ergot) that the time required to fill the glass globes was a more correct indication of the effect of ergot in slowing the current than calculating the number of millimetres, which differs in both carotids according to their diameter and according to the size of the globes. These varying periods of time were:

Normally.	Under ergot.
Dog, No. 3, a, 34 seconds.	58 seconds.
" No. 5, b, 35 "	.1 minute.
" No. 6, c, 36 "	1.5 minute.

5. Our thanks are due to Professor H. N. Martin for much kind advice.

ORIGINAL LECTURES.

THE LIGATURE OF ARTERIES.¹

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THE opening years of the present century were notable in the history of surgery for the extraordinary attention given to the ligature of arteries. The fame of Hunter's successful application of a ligature to the femoral artery for popliteal aneurism had led to renewed inquiry as to the nature of the changes which occur at the seat of ligation and as to the applicability of this operation to other arteries. The field of practice which was now opened was new and most inviting, especially to the younger surgeons. The treatment of aneurisms had hitherto proved most unsatisfactory, but now the way to success had apparently been definitely pointed out, and many were ready to test the value of the new method. Far greater interest, however, was manifested in the operations in England than in France, or other Continental countries. American students were then more frequently educated at the British schools, and the enthusiasm which pervaded the profession at these centres was imparted to the Americans. As a consequence, both British and American surgeons have won the greatest honors in this department of surgical practice.

It is the purpose of this paper to notice more especially the contributions of American surgeons to the improvement and development of the ligation of arteries.

The history of the ligation of arteries for the cure of aneurisms may be divided into three periods. The first period came down to 1785; the second extended from 1785 to 1868; and in the third we are living at present. The recognized operation in the first period is called the old method; that of the second period the new method; that of the third, or present period, the antiseptic method.

The old method dates back to the Greek writers. The principle on which it was based was the obliteration of the tumor by freely opening the sac and promoting suppuration. The feature of the operation which excited most interest among surgeons, and led to improve-

ments, was the method of arresting hæmorrhage. At first the open artery was plugged after the sac was incised—pledgets containing caustic being sometimes employed. Subsequently, the open artery was ligated at the bottom of the sac, and then the sac was filled with lint or other materials, and allowed to suppurate. A still further improvement was the ligation of the vessel, externally but close to the tumor, and the subsequent incision of the sac. Again two ligatures were applied, one above and the other below the tumor. But, whatever method was employed to prevent hæmorrhage, the operation terminated by opening the sac. This operation is described by observers of that period as being most disastrous into results. The suffering of the patients was most severe and the mortality was enormous.

In 1710 an operation was performed which was a radical departure from the old method. For the first time, apparently, the aneurismal tumor was not laid open after ligation of the artery. It was the ligation of the brachial artery by Anel. The patient had an aneurism at the bend of the elbow following venesection, and Anel applied the ligature as near to the tumor as possible. In this respect the operation did not differ from that practised at the time. But he did not touch the aneurism, as was the custom, and was gratified to see the tumor gradually diminish and finally disappear. This operation did not, however, attract attention for three-quarters of a century, and the old method continued to be practised until 1785. It is not difficult to discover, however, in the surgical literature of that time a growing discontent with the operation, and courses of inquiry, which must in the minds of the leading thinkers and observers ripen into radical changes in practice. Pott, in England, and Deschamps, in France, discarded the operation, and preferred amputation of the limb in which the aneurism was located. Cases of the spontaneous cure of aneurism were studied in London, and in one instance John Hunter is reported to have been in consultation in such a case.

The first authentic departure from the old method after Anel's operation occurred in June, 1785, when Desault repeated his operation for a popliteal aneurism, and with success. It has been claimed by French authors that this operation inaugurated the new method, but according to Sabatier the ligature was applied at the upper part of the tumor, and the operator had to separate the nerve from the artery. These facts prove conclusively that the operator applied the ligature close to the tumor, as did Anel. These operations were certainly important steps in advance, and demonstrated all of the possibilities of a century of subsequent improvements. They proved conclusively that the ligation of the artery on the proximal side of the tumor might result in obliteration of the aneurism without opening the sac. Anel's remarks upon his case show that he based the operation upon physiological conclusions, and that it was not an accidental or an empirical procedure. He states that, after ligating the artery, he did not touch the sac, "not doubting but that the blood contained in it would be dissipated, being at liberty to pass on toward the extremity; that the sac, being once empty, would not fill again; that the layers of membrane that formed it would not fail to collapse; and that thus the tumor would disappear, all of which happened as I thought." The de-

¹ The Address in Surgery before the New York State Medical Association, Oct. 23, 1890.

fect in this operation was the application of the ligature so near to the aneurism that it was liable to be placed on a diseased portion of the artery, and hence lead to a fatal result from secondary hæmorrhage. Hunter recognized this fact, as the accident had happened several times to him, as appears from Home's account of his operation, and sought to remedy the defect by applying the ligature to the artery at a point sufficiently distant from the aneurism, on the proximal side, to insure healthy tissue.

Home, who reported the case, remarks as follows:

"The common method of operating in cases of popliteal aneurism having in many instances proved unsuccessful, the operation itself has been condemned by some of our most eminent surgeons. If we consider the cases in which it has been performed, and where the patients have died, we shall probably find that in all of them the artery had been diseased at the part enclosed by the ligature, and had either sloughed off, or had been cut through where it was tied, so that the sides of the artery, though brought together, had not remained a sufficient length of time in that situation to unite by the first intention, and the patients lost their lives from the consequent hæmorrhage."

These statements of Home undoubtedly embody the reflections of Hunter upon the causes of the fatal issue of the old method as modified by Anel, and as recently practised successfully by Desault.

It naturally followed that Hunter should propose to ligate the artery at a higher point, and the reasoning which led to his now famous operation is thus given by Home:

"The femoral and popliteal arteries are portions of the same trunk, presenting themselves on different sides of the thigh, and are readily come at in either situation; but where the artery is passing from the one side to the other, it is more buried in the surrounding parts, and cannot be exposed without some difficulty. In performing the operation for the popliteal aneurism, especially when the tumor is large, the ligature is commonly applied on the artery at that part where it emerges from the muscles. This will be too limited a space should it prove diseased for some way higher up; and, if the artery should afterward give way from any of the causes above mentioned, there will not be a sufficient length of vessel remaining to allow of its being again secured in the ham. To follow the artery up through the insertions of the triceps muscle, to get at a portion of it where it is sound, becomes a very disagreeable part of the operation; and to make an incision on the forepart of the thigh to get at and secure the femoral artery, would be breaking new ground—a thing to be avoided, if possible, in all operations."

In December, 1785, six months after Desault performed his operation, Hunter had the opportunity of putting into practice his preconceived views. The point of ligation was "rather below the middle of the thigh," which must have been about the entrance of the artery into Hunter's canal. Evidently he was disposed to depart "as little as possible" from the old method. He applied a double ligature and tied both portions, but so slightly as only to compress the sides of the artery together. He then applied a second double ligature, lower on the artery, and tied it in the same manner as at first. It is an interesting fact that, in this operation, he included both the artery and vein in the ligatures.

Hunter, it was stated, used four ligatures, and merely tightened them so as to stop the circulation. Home states that "the reason for passing four ligatures was to compress such a length of artery as might make up for the want of tightness, as he chose to avoid great pressure on the vessel at any one part." This practice was in accordance with the prevailing opinion of that period, that arteries were closed by union of the opposed surfaces. The doctrine had come down from Ambrose Paré, and in the use of the ligature this object was especially sought. In various ways the ligature was modified to accomplish that purpose, but for the most part the flat ligature was preferred.

The lessons which Hunter drew from his operation were: (1) that a number of ligatures is not useful, and that one is sufficient; (2) that the artery should not be disturbed further than is necessary to secure the passage of the ligature; (3) that it is not desirable to heal the wound by first intention, but, rather, to allow the cut surface to inflame and suppurate, in order to have it in one's power to reach the artery more readily.

Hunter operated a second time soon after, and applied a single large ligature to both the artery and the vein. He left the wound open to heal by granulation, but his patient died, on the twenty-sixth day, from suppuration and hæmorrhage, due, as he believed, to the open state of the wound. When the hæmorrhage occurred he ligated the artery at a higher point, but without avail. In the third case, he applied a single ligature, and only to the artery; he also closed the wound to secure union by first intention. This case made a good recovery, as did two succeeding cases operated on in a similar manner.

A review of the surgical literature of that period makes it very evident that Hunter's operation was only one step, and by no means a very long one, in the steady advance of improvements in the treatment of aneurism by operative methods. Anel proved that aneurism might be cured by the simple ligation of the artery on its proximal side, without incision of the sac, and thus incurring the dangers of subsequent suppuration. The fault in his operation is, that he adhered to the old method of applying the ligature as near as possible to the tumor, and thus was liable to place it upon a part of the artery partaking of the disease which caused the aneurism, the result of which might be secondary hæmorrhage. Hunter remedied this defect by applying the ligature a little further from the aneurism, and at as short a distance as possible, in order to secure a healthy portion of the artery. He employed the ligature as was practised at that time, with a view of simply compressing the sides of the artery, and securing union by adhesive inflammation. On repeating the operation, he gradually improved in the use of the ligature and finally employed one where he had used four.

It is reported by Home that Hunter's operation was frequently repeated in the London hospitals, but with many modifications. For the most part, the departures from his method were rather toward Anel's operation. Birch used two ligatures, but left the second one loose. Earle applied the ligature above the aneurism, but in the popliteal space. Pott operated in a similar manner. Home, however, followed strictly the method of Hunter, and with marked success. At the close of the century, the merits of the new method were fully recognized, and

pioneers began to venture into new and unexplored regions.

Another step in advance of the old method, and scarcely less important than that made by Hunter, was suggested by Brasdor. This consisted in applying the ligature upon the distal side of the aneurism, instead of the proximal, and leaving the aneurism to consolidate by means of the blood entering the sac. This operation differed slightly, if at all, in its practical effects upon the physiological changes in the aneurism, from the operation of Hunter. It was a most important suggestion, for it enabled the operator to treat successfully a class of cases in which it was impossible to ligate the main trunk on the cardiac side of the tumor. Desault advocated the operation, but Deschamps and Astley Cooper were the first to put the method in practice, the former for a femoral aneurism and the latter for an iliac aneurism. Both failed disastrously. It was not again practised until 1825, when Wardrop applied a ligature to the carotid on the distal side of the tumor, and his patient recovered. Since that date it has become a favorite operation in cases which do not admit of Hunter's method. Mott was the first to operate by this method in this country, his cases being aneurisms of the innominate, for which he ligated the carotid. The first patient was cured, the second died from hæmorrhage. Mott heartily approved the operation, and the success which has since attended it proves his practical sagacity.

The operation of Hunter renewed the discussion, which had long been in progress, relating to the action of the ligature on the artery. As has been stated, the prevailing opinion at the close of the century was that the ligature should simply compress the sides of the artery together, when union takes place by adhesion of the opposed surfaces. This view led to various devices to promote the proper contact of the inner surfaces of the artery. A favorite ligature was made of a number of threads, which was called the "flat ligature." For the same purpose, more than one ligature was employed. Again, compresses were placed under the ligature and on the artery.

In 1803-4, a very original and exact series of experiments was performed by Dr. J. F. D. Jones, then a recent graduate of the Edinburgh school, for the purpose of determining the exact changes which a ligature effected on an artery. The most important conclusions from these experiments were: (1) that when the ligature is properly applied, it cuts through the internal and middle coats, and brings the wounded surfaces together; (2) that an inflammation is excited of the internal and middle coats which gives rise to an effusion of lymph, by which the wounded surfaces are united and the canal rendered impervious; (3) that an ulceration of the external coat follows, and thus there is produced a complete obliteration of the canal of the artery.

Though these propositions were combated by many authors, they greatly influenced leading surgeons, and finally came to be the prevailing belief, and continued to govern practice down to the antiseptic period.

The second notable incident of that discussion is the paper of Mr. Lawrence, in 1814, advocating the use of a very fine silk ligature, and cutting off both ends of the liga-

ture. Hitherto, vegetable matter had been used, as, for example, hemp. It was now proposed to use animal matter, and silk was selected in the belief that it would soften and dissolve in such a manner as to be carried away by interstitial absorption. Mr. Lawrence proposed to apply a small ligature, close the wound, secure union by the first intention, and leave the ligature to be absorbed. He selected a fine quality of dentist's silk, and employed in each ligature the smallest amount possible to tie the artery. He says: "The method I have adopted consists in tying the vessels with fine silk ligatures and cutting off the ends as close to the knot as is consistent with its security. Thus, the foreign matter is reduced to the insignificant quantity which forms the noose actually surrounding the vessel, and the knot by which that noose is fastened. Of the silk, which I commonly employ, a portion sufficient to tie a large artery, when the ends are thus cut off, weighs between $\frac{1}{10}$ and $\frac{1}{20}$ of a grain; a similar portion of the thickest kind I have tried weighs $\frac{1}{10}$ of a grain, and of the slenderest $\frac{1}{100}$." Mr. Lawrence states that "during the last ten months I have employed this method of securing the arteries in ten or eleven cases of amputation, in six operations on the breast, and in the removal of two testicles." With but one exception, the cases all did well, the wounds healed readily, and nothing was seen of the ligatures. Silk was now more frequently employed, but it was soon discovered that the ligature did not dissolve, and hence remained to cause future irritation and suppuration. While silk came to be preferred as a ligature, the method of Lawrence in closing the wound was not approved.

It is quite remarkable that Mr. Lawrence's suggestion caused no change in practice. He fairly anticipated the antiseptic or aseptic period, and the success of his method commended it to the favorable notice of every operator. It was, however, rejected or unheeded, and the method of Jones continued to be the favorite operation half a century longer, viz., the single ligature with one end depending from the wound. Mott rejected Lawrence's method with the remark: "The absurdity of it consists in this, that the wound will be healed by the first intention, and the ligatures, by being left to remain as an extraneous substance, will, in the course of five or six weeks, manifest their injurious action by producing suppuration." This practice, he thought, was the other extreme of Scarpa's, who kept the wound constantly open.

Dr. Physick, of Philadelphia, seems to have been the first to recommend strictly animal structures for ligatures. He selected deer-skin, chamois, and catgut, and Dr. Dorsey employed them frequently.

A more remarkable contribution to the improvement of the ligature was made by Dr. Jameson, of Baltimore. He made a large number of experiments with various ligatures, and his conclusions completely anticipated the antiseptic period in everything except the use of positive antiseptic materials. He used a very soft deer-skin, cut into fine strips, which had the form of the old flat ligature. This ligature he applied with only sufficient firmness to press the sides of the artery together, and was careful not to divide the coats of the vessel. His purpose was to disturb the artery as little as possible, and especially not to injure the vasa vasorum, as he

relied upon the organization of lymph about the ligature to close the vessel permanently. He alleged, as a result of his experiments and observations upon animals, that when an animal ligature is applied, a capsule will surround the ligature so as not to disturb capillary vessels, or the vessel will be surrounded by an abundance of lymph, the ligature will be dissolved, and will not require removal. It is stated of Dr. Jameson's practice that for many years he used the deer-skin ligature in amputations—the ligature of the carotid, iliac, femoral, radial, and other arteries—and never had secondary hæmorrhage. In what exact terms he describes the appearance of an artery some time after it has been ligated with a catgut ligature antiseptically, will appear when I speak of the present period.

The difficulty of passing the ligature around the artery, owing to the want of a suitable instrument, was a great embarrassment to the early surgeons. Some operators used a probe with an eye, others selected curved needles. At length instruments began to be devised, and many of them are now objects of curiosity as specimens of human ingenuity. The first really useful instrument was devised by Drs. Physick and Hewson, of Philadelphia. This needle was used by Mott in ligating the innominate, and highly commended by him. He subsequently improved it by attaching the needle to the handle by a screw, by means of which the handle could be removed when the needle was under the artery. This he called the "American needle," and it is still the best in use.

Among the visitors at the public hospitals of London in 1784-1786 was Dr. Wright Post, of New York. He was a recent graduate of medicine, and had been a pupil of Dr. Richard Bailey, one of the leading surgeons of New York. Dr. Post was a man of acute observation, and had an ambition to excel in surgery. There is little doubt that he was present at St. George's Hospital on that memorable day in 1785 when Hunter tied the femoral, and that he drew from it the inspiration which led to his future achievements in this field of practice. On his return he became a lecturer on surgery in the Columbia Medical College. Mott, who was his pupil, states that, long before Sir Astley Cooper operated on the carotid, he heard Post in his lectures assert his belief that not only one carotid might be tied for aneurism, but that both might be interrupted by ligatures, on the same person, and the patient recover.

About the year 1794-1795 Dr. Post applied a ligature to the femoral artery on the plan of Hunter. This case has never been tabulated, and is alluded to incidentally in his report of the case of inguinal aneurism for which he ligated the external iliac, and by Mott, in his biography of Post. The patient had a femoral aneurism, caused by a wound of the artery fifteen years previously. The precise location of the aneurism is not given, nor the point at which the ligature was applied. He states that the patient recovered from the operation in about the ordinary time, and the tumor gradually diminished until it was reduced to a size not exceeding one inch in diameter. But the remarkable fact connected with it, to which he makes special allusion, was the continuance of the pulsation in the tumor. This he attributed to the increase in the size of the anastomosing vessels, due to the long continuance of the aneurism. The circulation

in the aneurism did not interfere with the gradual diminution of the tumor. He says: "The limb, which had been rendered wholly useless to him by the immense size of the tumor and the extreme pain which he had suffered in the later stages of it, recovered its powers in a reasonable time, and he has continued to use it in all the ordinary exercises of walking, riding, etc., with as much freedom and as little inconvenience as before the disease took place."

Mott, alluding to this case, states that the man was living thirty years after the operation. This was the nineteenth recorded ligation of the femoral after Hunter's first operation, and the first operation by the new method in this country. It was also the first instance of a discussion of a return of the pulsation in the aneurism after ligation of the artery, with a correct appreciation of the cause of such pulsation.

On January 9, 1813, Dr. Post ligated the common carotid artery for aneurism successfully. This was the fifth operation on the common carotid, and the third successful case. It was the first operation in this country for aneurism. In this case Post passed two ligatures around the artery, about three-quarters of an inch apart, and divided the artery between them. He also passed the needle through the artery, as recommended by the younger Cline, to prevent the ligature from slipping from the end of the artery.

The practice of applying two ligatures, and dividing the artery between them, dates back to Fabricius, of the seventeenth century, but was warmly advocated by Abernethy, and practised by him. The danger of hæmorrhage from the slipping of the ligature from the end of the artery was, at that time, regarded as very great, and to prevent it a needle was placed on the ligature after it was tied, and the thread was passed through the artery close to the ligature and tied with the knot already made. This expedient was first recommended by Dionis, and not by Cline, as stated by Post.

The patient recovered from the operation, but the aneurism opened after eight months, and a large hæmorrhage occurred. This hæmorrhage was repeated about six weeks later, when the entire contents of the sac appeared to be discharged, and healthy granulations sprang up. The recovery was now rapid and complete.

One year later, viz., January 4, 1814, Dr. Post applied a ligature to the external iliac for inguinal aneurism. The method of operating was interesting, for at that period no very definite rules had been fixed. He describes his operation as follows:

"An incision was made through the integuments with some degree of obliquity, between three and four inches long, beginning a small distance above the tumor, and extending upward externally to a middle line between the umbilicus and superior anterior spinous process of the ilium. The abdominal muscles were then cut through, until the peritoneum at the lower part of the wound was fully exposed. I next endeavored to detach this membrane from the crural arch so as to get at the artery without opening into the cavity of the peritoneum; but in this attempt I was frustrated. The strength and thickness of the peritoneum at this part were considerably greater than natural, and its adhesion to the ligament so firm that the separation, which is ordinarily so easily

effected, was found in this case altogether impracticable. This condition of the parts may reasonably be ascribed to the pressure of the aneurismal tumor. To arrive at the artery, therefore, under these circumstances, it was necessary to cut through the peritoneum, and thus expose the patient to the additional hazard of inflammation of this membrane, to which it is generally supposed to be very liable when an opening is made into the common cavity of the abdomen. But to accomplish my object there was no alternative. I did not hesitate, therefore, in proceeding with the operation in this manner."

He had great difficulty in his efforts to expose the artery and open the sheath, and to avoid enlarging the wound of the peritoneum he passed the needle, armed with the ligature, through the sheath, on the under side, from within outward. He employed a needle suggested by Dr. Physick, and which was used by Dr. Dorsey in his operation on the same artery. The patient made a good recovery.

The noticeable features in this case are:

1. The incision of the peritoneum and free exposure of the abdominal cavity. No harm seems to have followed this treatment of the peritoneum. There are two suggestions which may, perhaps, explain the freedom from peritonitis in this case. The first is that Dr. Post is always spoken of as a man of great fastidiousness as regards his personal appearance and dress; this led to extreme neatness and cleanliness of his hands and of his instruments, and of the details of his dressing of wounds. The second is the fact that, at the close of the first day, the patient was required to take an active cathartic, composed of infusion of senna, manna, and cream of tartar, which produced, according to the record, "frequent and copious dejections." This thorough action of the bowels would tend powerfully, according to present teachings, to remove the accumulating causes of acute peritonitis after incision of that membrane.

2. Pulsation in the tumor returned on the 24th day, and was continuing at the time of the report, three months after the operation, but without any change in the tumor. He raised the question as to the liability of the return of the aneurism, but decided that it would not return, basing his conclusion on his experience in the case of the femoral aneurism previously described.

On the 28th of November, 1816, Post again ligated the common carotid artery for a pulsating tumor of the neck, about which there was a difference of opinion as to its nature. The patient recovered from the operation, but died two years subsequently. The autopsy disclosed a tumor, with no indications of the previous existence of an aneurism. It was this case that Mott often alluded to in his lectures illustrating the difficulties of correctly diagnosing an aneurism from an abscess, or a tumor situated upon an artery. At the consultation of Post, Stevens, and Mott, the question raised was as to its being an aneurism, an abscess, or a solid tumor. Post regarded it as an aneurism, Stevens as an abscess, and Mott as a solid tumor. Stevens proposed to Post the propriety of exploring it by puncture with a lancet. Post responded by handing Stevens a lancet. Stevens declined, and proposed that Mott should explore. He also declined, and Post was allowed to exercise his discretion.

On the 8th of September, 1817, Dr. Post ligated the left subclavian, in its third part, for aneurism of the brachial artery. He employed the needles invented by Drs. Parrish, Hartshorne, and Hewson, of Philadelphia. The patient made a good recovery, though the aneurism ruptured and discharged its contents during convalescence. This was the eighth recorded operation on the subclavian artery, and the third which recovered. It was also the first operation upon that artery in this country by the new method.

It thus appears that at this early period in the history of the new method, Dr. Wright Post applied the ligature to four different arteries successfully, and twice to the carotid. And these were by no means simple and uncomplicated cases. Each case presented more than ordinary difficulties, and one—the external iliac—involved complications which, at that period especially almost uniformly proved fatal. A success like this was not recorded at that time, and has not been surpassed even in these antiseptic days. As already remarked, we can only account for his great and uniform success by the extreme care of the operator in protecting the wounds from the admission of the common forms of septic matter which adhere to the hands, instruments, and dressings.

Of the five operations, Dr. Post was anticipated in this country in but one instance, viz., ligation of the external iliac. Dr. Dorsey, of Philadelphia, operated in 1811, about three years before Dr. Post.

Great as was the merit of Dr. Post as a successful pioneer in this field, he was destined to be surpassed by his student and colleague in the New York hospital, Dr. Valentine Mott. Mott had not only imbibed a strong predilection for surgery by attendance upon Dr. Post's lectures, but he became also a pupil of Astley Cooper at a period when that surgeon was the leading operator in London. Cooper was the first surgeon who applied a ligature to the carotid artery for aneurism. This operation was performed in 1805, but was unsuccessful. In 1808 he repeated the operation successfully, and Mott was present at the operation. He always spoke enthusiastically of this occasion, and evidently was greatly stimulated by it to pursue the study of aneurisms and their treatment.

A few months later, Cooper attempted to ligate the left subclavian between the scaleni muscles, but failed. Mott was present at this operation also, and was deeply impressed with the difficulties of the procedure, and Cooper's skill and candor. Speaking of the operation, Mott states that "after working indefatigably with all his eminent skill and superlative tact for an hour and a half, he (Cooper) abandoned the operation."

On returning home, Mott was well equipped for the great career which was opened before him. His personal qualifications were of a high order. He was, first of all, a laborious student—not so much of books, for few were then to be had, but a student of nature. He performed no operation during his long life that he did not make the subject of careful study and preparation, if the circumstances permitted. Again, he was a very bold operator, and well adapted to be a pioneer. But this boldness was guarded and tempered by a conscientious conservatism. Moreover, his preparation for every operation, and his careful foresight of all possible emer-

gencies, rendered his fearlessness in undertaking operations entirely safe. Finally, he was a remarkably clean person, being even more fastidious in his dress than Dr. Post. It was a remark of one of his contemporaries that, on Dr. Mott's return from Europe, he was so extraordinarily neat in his person that he attracted the attention of every one when he appeared on the streets. This neatness extended to the care of his instruments, which he required should be thoroughly cleaned, not only after each operation, but also just before an operation. How much of his success in the recovery of his patients was due to this practical asepticism we now can only conjecture, but that it had a most potent influence there can be no doubt.

Mott's pioneer work appears in the ligation of the arteria innominata and the common iliac arteries. The application of a ligature to the innominate artery was not only Mott's greatest achievement in operative surgery, but was the most brilliant operation ever undertaken by any surgeon in the history of operative surgery to that date. Nor has it been excelled in this particular branch, if we consider all the circumstances attending the operation. It was by no means suddenly conceived and executed, but was the culmination of years of preparation. He states that "since the publication of Allan Burn's invaluable work on the surgical anatomy of the head and neck, I have been in the habit of showing, in my surgical lectures, the practicability of securing in a ligature the arteria innominata; and I have had no hesitation in remarking that it was my opinion, that this artery might be taken up for some condition of aneurisms; and that a surgeon with a steady hand and a correct knowledge of the parts would be justified in doing it." The proper case presented itself March 1, 1818, and he says, "I could not for a moment hesitate in recommending and performing the operation." Dr. Wright Post, whom he had so often aided, now became his assistant and guide. Though the operation finally failed after giving the most encouraging prospect of success, Mott was not disheartened, but regarded the practicability and propriety as satisfactorily established by this case, and predicted that it would prove to be "the bearer of a message to surgery containing new and important results."

The ligation of the primitive iliac for aneurism was performed March 15, 1827. Gibson had previously applied a ligature to this artery in a case of gunshot wound during a riot, but he simply seized a bleeding vessel with his finger, and applied two ligatures, and found at the autopsy that one was on the common iliac. Mott's operation was executed with his usual care and caution, though it was rendered very difficult owing to the size of the tumor and the adhesions of the peritoneum. The patient made a good recovery, and was living thirty years after. In the practice of other surgeons the operation has proved very fatal. During the twenty-five years following Mott's operation, there were eighteen ligations of the common iliac with fourteen deaths, or upward of seventy-seven per cent.

Mott's experience in the ligation of arteries was very great, and his success was remarkable. For example, he ligated the subclavian in its third part six times, all the cases successful; the common carotid thirty-two times, with five failures; the external iliac six times—

two died, one from drunkenness, one from secondary hæmorrhage; the femoral fifty-three times, failures not known. He had but one case of mortification of the extremity, a success which Dr. Blackman attributed to Mott's great attention to details. Fruitful as was Mott's career in great surgical deeds, the application of a ligature to the arteria innominata gave to him his most enduring reputation. He was accustomed to speak of the exsection of the entire clavicle as his "Waterloo operation," but the profession has accorded the highest distinction to the former operation.

Scarcely less remarkable as a triumph of bold and daring surgery was Dr. Kearney Rodgers's ligation of the left subclavian artery within the scaleni muscles, in 1845. Indeed, Mott, who was one of the consultants, opposed the operation at the time and afterward. He admitted that it might possibly "be tied by a careful and well-informed surgeon," but he "considered that it was improper to do so." But Rodgers had been led, as he states, "to investigate the subject with great care, and accordingly gave it my most sedulous attention." He adds, "I had always considered it as a perfectly justifiable operation, and one that a careful surgeon conversant with anatomy could accomplish, if the tumor was of moderate size." The consulting surgeons threw the entire responsibility upon him, and thus rendered the undertaking doubly important to the operator. He was about to attempt an operation which not only such veterans as Mott and Stevens declined positively to sanction, but which leading foreign authorities decided was not possible. Rodgers had before him, as he states, the utterance of Colles, the eminent Irish surgeon who first tied the right subclavian in the first part of its course. His conclusion was stated as follows:

"This operation, difficult on the right, must be deemed impracticable on the left subclavian. For the great depth from the surface at which this vessel is placed, the direct course which it runs in ascending to the top of the pleura, the sudden descent which it makes from this to sink under the protection of the clavicle, and the danger of including in the same ligature the eighth pair of nerves, the internal jugular vein, or the carotid, which all run close to, and nearly parallel with this artery—all these constitute such a combination of difficulties as must deter the most enterprising surgeon from undertaking this operation on the left side."

But Rodgers was a most skilful operator, of great courage and reserved mental force. He assumed the weighty responsibility which his colleagues imposed upon him, and true to his convictions of duty proceeded to execute the trust committed to his care. The operation proved in every respect as difficult as had been alleged, but he was thoroughly prepared for every emergency. The ligature was successfully applied, and for several days everything promised success, but on the thirteenth day a hæmorrhage occurred, and on the fifteenth the patient died. The lesson which Rodgers drew from his operation was that the vertebral artery, and, if possible, the thyroid axis, should be secured by ligature. He says in concluding his report of the case, that though the operation was unsuccessful, he trusts that, "from the knowledge thence derived, we shall be enabled to enlarge our sphere of usefulness and be the means of preserving human life." This was the first

and only attempt that has been made to ligate the left subclavian within the scaleni muscles.

During the quarter of a century preceding 1868 scarcely any improvement is noticeable in the ligature of arteries. The operations of Hunter and Brashdor were applied in a great variety of conditions, but no modifications worthy of note were made. There were, however, many notable achievements during that period in the ligation of arteries. Perhaps the most important was what has been regarded as the successful ligation of the innominate by Dr. A. W. Smyth, of New Orleans, in 1864. In this case the carotid was ligated at the same time, and on the fifty-fourth day the vertebral was also ligated. Another interesting incident in this period was the revival of the old method by Syme. In three instances he succeeded in opening the sac and tying the arteries at the base of the tumor. All recovered.

The part borne by American surgeons in the history of the ligature of arteries is most creditable. They have not only been pioneers in enlarging the boundaries of this field of practice, but they have cultivated it with a degree of success unrivalled even by British surgeons. An examination of the statistics of ligation of the principal arteries during the first three-quarters of the present century proves the correctness of this statement. Of sixteen operations upon the innominate, six were performed in this country, or nearly thirty-eight per cent. Of these operations one American surgeon performed the first, and another the only successful operation. Of thirteen ligations of the subclavian in the first part of its surgical course, American surgeons performed five, or more than thirty-eight per cent. Of these cases, all of which were fatal, an American surgeon alone ligated the left subclavian within the scaleni. A comparison of the operations upon all of the principal arteries exhibits an equally honorable record.

On the 31st of December, 1868, an event occurred which was destined to be the final consummation of all improvements in the ligatures of arteries. It was the occasion of the application of ligatures to the carotid artery of a calf, by Mr. Joseph Lister. The ligatures were of two different kinds, and were applied at an interval of about an inch and a half. The cardiac ligature was composed of three strips of peritoneum from the small intestine of an ox, firmly twisted; the distal thread was made of fine catgut. Both had been treated with a saturated watery solution of carbolic acid. The ligatures were cut short except that one end was longer than the other. The wound was completely closed, and it promptly healed. Thirty days after the operation the parts were examined, *post-mortem*, and the appearances carefully noted. There was an entire absence of inflammatory thickening in the vicinity of the vessel. The knots of the distal ligature had disappeared, and the only indications of the end which had been left long was a black speck, here and there, upon a delicate thread of cellular tissue in connection with the vessel. The cardiac ligature was continuous in structure with the cardiac wall. The short ends had disappeared, but the knot was represented by a soft, smooth lump, in the interior of which, and lying close to the wall of the artery, was a small residual portion of the original knot quite distinct from the living tissue around it. Between the proximal ligature and the heart, the formation of a

coagulum had been entirely prevented by a large vessel taking origin immediately above the part tied, which had thus borne for a month the full brunt of the cardiac impulse. Clots had formed on the distal side of the ligature. A more minute examination showed that the fleshy material which had been formed at the expense of the ligature was a beautiful example of fibro-plastic structure, the coarse fibres which mainly constituted it being composed of very large elongated cells, often containing several nuclei, and presenting, in their course, branchings and thickenings of various forms. At the situation of the distal ligature the structure of the vessel seemed entirely unaffected, the middle coat was neither thicker nor thinner than the neighboring parts. The vessel, so far from showing any sign of giving away, appeared to have additional strength from the operation. The encircling ring of new tissues, incorporated with the arterial walls, must have had a corroborative effect.

Some time after Mr. Lister's publication, I had an opportunity to test upon the human subject the practical value of this experiment.

"A man, aged forty years, suffering from cancer of the tongue, tonsil, and pharynx, came under treatment at an advanced stage of the disease. He was extremely emaciated, very shallow, could swallow liquids only and with great difficulty, and spoke in a hoarse whisper. He had recently had several slight hæmorrhages from the region of the affected tonsil, and was very apprehensive lest he should bleed to death, and extremely anxious to have measures taken to prevent its recurrence. Extirpation of the whole or any part of the growth so as to benefit him was impossible without endangering his life. The only operation practicable was ligature of the trunk of the vessel whose branches were distributed to that region—viz., the external carotid. This operation he urged to have performed, and accordingly a catgut ligature, carbolized, was applied. The ends were cut short, and the wound closed. Except a slight formation of pus under the skin, due to imperfect drainage, but having no connection with the ligature, the recovery was prompt, and the patient was soon walking about as usual, the cicatrix becoming firm and depressed.

"He had no more hæmorrhages, but died of exhaustion from inanition six weeks after the operation. The autopsy revealed the following condition of the parts involved in the operation: The common carotid, laid open to its bifurcation, was entirely free and without discoverable change. At the bifurcation, and throughout its extent, the internal carotid was normal and without a trace of injury. Near the origin of the external carotid the calibre of that vessel suddenly diminished, and, a little higher, was completely closed. There was no trace of a clot, and no evidence that there had been a clot. But what attracted most attention was a bulbous enlargement of the artery at the point of ligation, which had the appearance of a large ring of new tissue around the artery. This ring was as hard and dense as a cicatrix. An incision was next made through this structure down to the centre, or to a point corresponding with the centre, of the vessel. The calibre of the vessel was completely obliterated by the firm union of the opposing surfaces. Above this point was a well-formed clot extending to the origin of the superior thyroid. On dissecting a ring of new tissue it was found to be well organized,

and at two points was discovered a fine black substance, one portion being an eighth of an inch long, having a direction transverse to the long axis of the artery. These threads were the only remains of the ligature traceable."

Looking at the specimen as a whole, it was apparent that the results of the application of the ligature in this case had been: 1. The immediate closure of the artery by pressure. 2. No injury to the internal and middle coats. 3. The permanent closure of the artery by the union of the opposing surfaces. 4. The strengthening of the artery, immeasurably, by the formation of an immense ligature of living tissue. 5. The possibility of ligating an artery close to its origin, with only the result of strengthening the vessel at that point.

Commenting upon his experiment, Mr. Lister remarked:

"It appears that by applying a ligature of animal tissue antiseptically upon the artery, whether tightly or gently, we virtually surround it with a ring of living tissue, and strengthen the vessel where we obstruct it. . . . The surgeon may now tie an arterial trunk in its continuity close to a large branch, secure alike against secondary hæmorrhage and deep-seated suppuration."

To one who has been personally familiar with the painful anxiety with which the earlier surgeons watched their cases, especially at the period of the separation of the ligature, such language seems preposterous. But, fortunately, it is true. We have reached the happy era of surgery, when to ligate an artery means to strengthen it at the point of ligation. We can ask no more. The improvements in this branch of surgical practice have attained—PERFECTION.

MEDICAL PROGRESS.

Parotitis due to the Pneumococcus.—DUPLAY, in *La Semaine Médicale* of January 14, 1891, reports an interesting case of parotitis following an attack of pneumonia in a man forty-seven years old. Succeeding all the symptoms of a well-developed pneumonia, there suddenly ensued an enormous swelling in the region of the left parotid gland, with an œdema of the entire side of the face, and accompanied with severe pain, which was increased by pressure or by movement of the jaws. This was accompanied by a rise of temperature and symptoms of general depression. The diseases in which this condition occurs are numerous. It has been observed to follow many infectious diseases, including typhus and typhoid fevers, cholera, eruptive fevers, dysentery, pyæmia, puerperal fever, and, as in this case, pneumonia. The pneumococcus was first discovered by Pasteur in 1879, and investigated by Friedländer in 1882, and, later, by Talamon; Fränkel, and Netter, and is known as the pneumococcus of Fränkel. It is slightly elongated and encapsulated, and is grouped in the form of a diplococcus. It acquires a great virulence by culture, which, however, disappears in a short time—usually by the end of seven days. This is peculiar, especially if we bear in mind that the defervescence in pneumonia usually occurs about the seventh day. This micrococcus not only invades the lungs, but is found in the mouth of many healthy patients, and is usually

entirely inoffensive. It becomes virulent, however, under certain conditions which are not yet understood, and gives rise to disease in whatever part of the body it enters. It may pass through the Eustachian tube, and produce an otitis; or into the sinuses, and give rise to a coryza; or, under certain circumstances, it may even enter the cranial cavity and produce a basal meningitis. The digestive tract is rarely invaded by this micro-organism. The prognosis of these cases is generally grave, pyæmia usually causing death. However, under modern antiseptics, it is not so invariably fatal as it formerly was. As regards treatment, the strength of the patient must be sustained, and it is well in some cases to make large incisions early, thus aborting the progress of the disease; while, in other cases, to open the pockets of pus as they are formed, is all that will be necessary.

A Mixture for Dissolving Diphtheritic Membranes.—CALDWELL recommends the following solution for this purpose:

R.—Papain	2½ drachms.
Hydronaphthol	2 grains.
Hydrochloric acid	15 drops.
Distilled water	3 ounces.
Glycerin	2 drachms.—M.

This is to be applied to the affected parts by means of an atomizer every half hour.

Antiseptic and Sedative Treatment of Hæmorrhoids.—In the *Revue de Thérapeutique Médico-Chirurgicale* the following treatment, consisting in the employment of chrysarobin with belladonna and iodoform, is recommended by KASSOBUDSKI as an equally useful application in the treatment of internal and external hæmorrhoids. For the internal hæmorrhoids, he prescribes the following:

R.—Chrysarobin	15 grains.
Iodoform	5 "
Extract of belladonna	8 "
Cacao butter	6 drachms.

Of this are made ten suppositories, and one suppository ought to be inserted into the rectum each day. After five or six hours the pain and the tumor diminish. The treatment may continue for several months without harm.

For external hemorrhoids the author recommends washing them with a solution of corrosive sublimate of the strength of 1 to 1000 or of carbolic acid, 1 to 50. After this the following salve may be applied:

R.—Iodoform	5 grains.
Extract of belladonna	8 "
Vaseline	1 ounce.

Treatment of Dysentery.—MINORBI, in *L'Union Médical*, describes a method of treatment which he has followed in twenty-three cases of dysentery. In one case a cure was obtained in a very few days. The treatment consisted in the insertion into the rectum of suppositories made in the following manner:

R.—Naphthalin } of each	2½ drachms.
Cacao butter }	

Where there is ulceration or any other condition

which tends to make the use of a suppository painful or dangerous, he has recourse to the following injection :

R.—Naphthalin 75 grains.
Olive oil 6 drachms.

At the beginning of an attack, when there is a good deal of tenesmus, the injections should be given every half hour, but ordinarily it is sufficient to repeat them three or four times in the twenty-four hours. The advantage of this method is that it does not cause constipation, which opium is apt to produce.

ROSSBACH employs naphthalin in the following manner in this condition :

R.—Naphthalin 10 grains.
Boiling water 4 ounces.
Decoction of marshmallow 1 pint.

This is to be used as an injection at the temperature of 100°. In children who suffer from diarrhoea dependent upon the presence of parasites in the lower bowel, the quantity of naphthalin which is employed should not be more than 15 grains in 4 ounces of oil.—*L'Union Médicale*, December 7, 1890.

Treatment of Articular Rheumatism by Mercury.—CALALB, of Bucharest, employs the following method in the treatment of acute articular rheumatism : He applies ointment of mercury around the inflamed joint, and surrounds this with gutta-percha, which is kept in place by bandages of tarlatan. This dressing is left undisturbed for four days, and at the end of that time he asserts that the pain completely disappears, or, at least, is very much ameliorated. The application may then be renewed. Care should, of course, be taken that too much mercury ointment is not used, owing to the danger of ptyalism. In eight cases in which the author has resorted to this method he had the most excellent results, and he states that the patients bear the mercury exceedingly well. It is advisable to let them have a gargle of chlorate of potassium and myrrh to prevent any tenderness of the gums.—*Revue Internationale de Bibliographie Médicale*, January 25, 1891.

Treatment of Erysipelas by Corrosive Sublimate.—CAYET, in a Paris thesis, gives a method of treatment which was employed by Talamon in the treatment of the pustules of smallpox and which he has used for the relief of erysipelas. The following solution is applied to the affected parts by means of an atomizer :

R.—Corrosive sublimate } of each 15 grains.
Tartaric or citric acid }
Alcohol 1½ drachms.
Sulphuric ether, enough to make 3 ounces.

This solution should not be sprayed into the nostrils and the eyes must be protected. The atomizations are to be repeated two or three times a day, and Cayet asserts that the cutaneous inflammation passes away in four days under this treatment.—*Revue Internationale de Bibliographie Médicale*, January 25, 1891.

The Absorption of Medicaments from Ointments.—Much discussion has arisen as to the rapidity of the absorption of drugs through the skin and as to the best vehicle for

bringing them in contact with the body. Lanolin has been highly praised, and vaseline has been thought to be a non-absorbable substance which should not be employed. On the other hand, LUFF has reached the conclusion that the best ointment for the promotion of absorption is vaseline. He employed iodide of potassium, carbolic acid, and resorcin mixed with vaseline, and with lard or lanolin, and examined the urine of the patients to determine how rapidly the drugs were absorbed and eliminated. The absorption of iodide of potassium, according to this series of tests, is as follows : When mixed with vaseline, it appears in the urine in one hour ; when mixed with lard, in nine hours, and when mixed with lanolin, not at all. Carbolic acid, when mixed with vaseline, appears in the urine in two and a half hours ; when mixed with lard, in five hours, and when mixed with lanolin does not appear at all. In the case of resorcin and vaseline, the drug was recovered from the urine in ten hours ; when mixed with lard, in fifteen hours, and when mixed with lanolin, not at all. Further tests also showed that drugs mixed with lanolin did not appear in the urine even after twenty-four hours.—*Revue Internationale de Bibliographie Médicale*, January 25, 1891.

Treatment of Malignant Pustule.—In the treatment of malignant pustule, CASSON has employed with success subcutaneous injections of bichloride of mercury. In one case there were four pustules, and into each of these he injected strong solutions of corrosive sublimate. The pain which followed the injection disappeared after the first use of the drug. At the same time that these injections were employed the surface of the pustule was dressed with lint soaked in a strong solution of the corrosive sublimate.—*Revue Internationale de Bibliographie Médicale*, January 25, 1891.

The Duration of Pregnancy.—OLIVER concludes, after very careful observation, that the duration of pregnancy in the human female varies as much as it does in the case of many of the lower animals. Issmer, reckoning only cases in which the fetus was well developed, asserts that the duration ranges from 260 to 304 days. But Oliver believes there must be some error in this statement. If we reckon from the last menstruation, we must be careful to ascertain the exact date of the cessation of this, for it will be remarked that where the duration of the discharge varies little, the woman, when asked, is more likely to give the date of beginning than the date of cessation of the last menstruation, and in this way mistakes may arise in our calculation to the extent of four or more days. The majority of authors are agreed that in reckoning the duration of pregnancy in woman, we ought to fix the probable date of delivery on the 278th day from the cessation of the last menstruation. He is of opinion that the best results will be obtained by ascertaining, first, the date of the cessation of the last menstruation, and then the usual duration of the inter-menstrual period in each given case ; the number of inter-menstrual days should then be divided by two, and it will be found that the 260th day from the middle of the inter-menstrual period will most probably be the date of confinement.—*Liverpool Medico-Chirurgical Journal*, January, 1891.

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SATURDAY, MARCH 14, 1891.

THE INFLUENCE OF SWEET OIL ON CHOLELITHIASIS.

THE *Medical Record* notices editorially an interesting discussion of the Medical Society of North Carolina upon the influence of sweet oil on the removal of gall-stones. The discussion subsequently appeared in the *North Carolina Medical Journal*. The subject might seem to have been sufficiently studied for some definite opinion to be reached as to the utility of this remedy, and yet, judging from our contemporary's remarks, chaos still prevails—at least in North Carolina. The conclusions arrived at, if, indeed, it may be said that any were reached, are quite at variance with those now generally received in this country and abroad. They are, briefly, that sweet oil relieves gall-stone colic and prevents its recurrence rather by some modifying influence upon the duct and adjacent bowel than by any effect in expelling the stone. Yet it is mentioned that the President of the society described the case of a man who had three attacks of hepatic colic, each of which oil relieved. The gall-bladder at each seizure was much distended with bile and a stone a half-inch in diameter could be distinctly felt in the gall-bladder. Under the influence of oil the gall-bladder expelled the bile but the stone could still be felt within it. As colic could scarcely be caused by a

calculus in the gall-bladder, the non-expulsion of this concretion practically had no bearing on the case. Each attack was, in all probability, due to a similar concretion lodged in the common bile-duct, and which was floated into the bowels under the influence of the oil. This fact does not seem to have been grasped either by those who took part in the discussion or by our contemporary, for it appears that this case was narrated to demonstrate that oil relieves colic in some mysterious way without striking at the cause.

There is no question that the usual cause of hepatic colic is the presence of a gall-stone in one of the biliary ducts—hepatic, cystic, or choledochus; and there seems no doubt that, in a very fair proportion of cases, sweet oil does effectually check colic and prevent its recurrence. Abundant testimony now exists as to this, and it has come to be generally accepted that sweet oil acts as a cholagogue, and that when gall-stones are present in the ducts it tends to promote their extrusion. The distinguished therapist GERMAINE SÉE recently, in *La Médecine Moderne*, strongly advocates but two remedies for the relief of cholelithiasis, sodium salicylate and olive oil. Clinical experience with the latter causes him to believe that it both promotes the expulsion of gall-stones and relieves the attending pain and jaundice; though he accepts the results of Rosenberg's experiments on dogs, which show that sweet oil decidedly increases the outflow of bile, especially of its more fluid portions, and that this increase is synchronous with the formation of an excess of fatty acids, he is unable to explain these effects.

The only plausible theory yet offered to account for the efficiency of the oil is that advanced by DR. D. D. STEWART in a contribution to THE MEDICAL NEWS (November 23, 1889), and we are somewhat surprised that it has not received wider notice.

Having in mind that oils and fats are decomposed in the duodenum into their fatty acids and glycerin, it occurred to Dr. Stewart that glycerin so formed probably has the same action in the duodenum as in the rectum when used as a laxative enema, withdrawing water and causing hyperæmia and irritation of the afferent nerves, thus leading to energetic reflex contraction of the gall-bladder, and cystic and common bile-duct. Hence concretions therein sufficiently small to be expelled, are rapidly passed into the duodenum. He suggested also that the diffusive power of glycerin might enable it to enter the ductus

communis and even the cystic and hepatic ducts, and perhaps reach the gall-bladder and the liver, producing a similar depletion of the vessels there and reflexly exciting the muscular fibres of these ducts to contraction, thus probably causing an out-flow of dilute bile which would assist in expelling the stone. In the two cases in which Dr. Stewart used oil, gall-stones were recovered from the fæces in addition to quantities of soapy concretions. Noting the smooth, apparently eroded appearance of several of the stones, it occurred to him that the warm solutions of soap formed by the decomposition of the oil might exert a solvent action on cholesterin stones and in some instances cause their disintegration in their passage through the intestines. He found that a solution of soft soap had a very solvent effect on a portion of an old cholesterin stone placed in it. He thought that this might, in a measure, account for the failure to find gall-stones where search had been properly made in cases of hepatic colic treated by large doses of oil. It is worthy of note, that Rosenberg states that fatty acids also are capable of dissolving cholesterin.

Should this plausible theory of Dr. Stewart's be confirmed by experiment, the treatment of hepatic colic may be pursued on a more intelligent basis than hitherto. Glycerin might be administered in gelatin capsules in place of oil, the capsule being used to prevent the dilution of the glycerin before it reaches the duodenum. Or should oil be preferred, pancreatin, in capsules, might be simultaneously administered to insure its complete splitting up.

UTERINE RETRO-DISPLACEMENTS.

As is usual with most ailments of the human body, the treatment of retro-displacements of the uterus has undergone many changes; in fact, the evolution is still progressing. The method of replacing the uterus and retaining it in its proper position by the aid of pessaries is one of the oldest and the one to which the profession has most constantly resorted. During the past few years, since surgical procedures have taken such a prominent position in the treatment of diseases of women, many plans based on surgical principles have been devised and put to trial. The mere number of these operations demonstrates how unsatisfactory any and all of them have proven. Had the results of one of them been even approximately satisfactory, the profession would not be slow to adopt

it; the fact that none of them has been generally acceptable is but another indication that they do not fulfil all that is promised for them. Rabenau's method of excising a wedge-shaped piece from the anterior lip has been universally abandoned on account of its inefficiency. Both electricity and Thure-Brandt's method of massage have been enthusiastically praised and then forgotten. The Alexander-Adams operation of shortening the round ligaments extra-peritoneally and stitching them to the inguinal canal, has been a matter of active controversy. Although some few surgeons seem to get good results from it and report long series of successful cases, yet it fails to appeal, in ease of performance and permanence of results, to the vast majority of the profession. Edebohl's modification of splitting open the entire length of the inguinal canal seems to promise greater ease and certainty in the performance of the operation itself, but gives no promise of better results. The method proposed by Schuecking of passing a suture through the anterior wall of the uterus *per vaginam*, bringing the end out again into the vagina and then tying the two free ends, has fortunately not been adopted in this country. Schuecking himself reports that a number of his cases had bloody urine after the operation. The results of such procedure must in the long run be disastrous. The method of opening the peritoneal cavity and stitching the fundus to the abdominal walls, contributed by German surgeons, with or without scarifying the surfaces to be united, for a time gave promise of permanent good and was most enthusiastically recommended in this country. It was not long, however, before failures began to be noted, and finally the abdomen had to be reopened for the purpose of undoing the mischief created by the operation. The operation proposed by Wylie, of doubling the round ligaments intra-peritoneally upon themselves and stitching them in that position, as well as the modification of this procedure proposed by Dudley, of denuding the round ligaments and stitching them to a denuded surface on the anterior aspect of the uterus, although extremely ingenious, has not found many advocates.

Kelly, at the meeting of the American Gynecological Society in 1889, proposed the following operation, but abandoned it later for the reason that all his cases had proven failures. The operation consisted in pushing the uterus up *per vaginam* until the fundus could be seen impinging upon the

abdominal wall. A curved needle was then carried through the skin and the fundus of the uterus, together with all the intervening tissues. It was brought out again at a point directly opposite the point of entrance. The two free ends were then tied. Krug (*New York Medical Journal*, January 3, 1891) modifies this procedure by cutting through all the abdominal tissues until he reaches the peritoneum. With the uterus lifted up from the vagina and a finger in the wound, a needle is passed through the whole thickness of the abdominal wall. The point of entrance of the needle is on the skin surface, a quarter of an inch from the incision. With the cutting edge of the needle, guided by the finger in the wound, the uterus is scarified on its anterior surface to the extent of about a square inch. The needle is finally carried through the fundus and brought out through the abdominal walls at a point opposite the point of entrance. Two such sutures are introduced and when the free ends are tied the wound is closed. The advantages claimed for this method are that the peritoneal cavity is not opened and at the same time the denudation is safely performed. The author reports six cases operated upon by this method, but the time is too short to be able to judge as to the permanency of the results.

Krug distinctly says that this operation is only applicable to cases in which the retro-displacement is uncomplicated. This is equally true of all the operations in which the peritoneal cavity is not opened, and just here lies the great fault of all such procedures. It is exceptional that an uncomplicated retro-displacement causes any trouble, and it will be frequently found in cases in which there is no local complication that the trouble is a general one, with a local manifestation of symptoms. If there be really no local complication the uterus can readily be replaced and held in position by a properly-fitting pessary; consequently the foregoing operation, with all its kind, would seem to be superfluous. If, on the other hand, there are adhesions present, all these extra-peritoneal operations must of necessity fail. Experience has shown that the intra-peritoneal methods have accomplished little more. The normal position of the uterus is in the pelvic cavity and all attempts to bring and retain it in the abdominal cavity are irrational and must fail. For uncomplicated cases the risks of a serious operation should not be taken, especially as the pessary is at our command. If the uterine appendages are dis-

eased, the shortening of both the round and broad ligaments incident to the removal of the appendages will in itself correct the malposition. If the only complicating trouble be adhesions of the fundus, without any disease of the tubes or ovaries, the most rational procedures would seem to be outlined in the principles advanced by Wylie and Dudley.

REVIEWS.

A TEXT-BOOK OF HYGIENE FROM AN AMERICAN STAND-POINT. By G. H. ROHÉ, M.D. Second edition, thoroughly revised and largely rewritten, with Illustrations and Tables. Philadelphia and London: F. A. Davis, 1891.

NOTWITHSTANDING the fact that the Illinois State Board of Health requires practitioners who come within its jurisdiction for the purpose of practising medicine to have attended lectures upon the subject of hygiene, very much less attention is given to this branch than necessity requires; and the fact that the entire subject has been so abused by those who are quacks, or exist on the borderland of quackery, has caused certain members of the profession to regard with distrust those who devote themselves to the study of Preventive Medicine. These objections, however, do not obtain against the book which has been prepared by Dr. Rohé. Not only is the advice which it contains of practical utility but it is so put that "he who runs may read," and profit by it. The article on the "Influence of Cooking upon Food" and that on "Beverages containing Alcohol" are unusually good and fully up to the times. The recommendation is made that American wines should be used in place of the imported wines which are, for various reasons, in many cases greatly adulterated. A very considerable addition to the book is the article upon "Quarantine," by Dr. Walter Wyman, of the United States Marine-Hospital Service, and the contribution of Dr. Albert L. Gihon, of the United States Navy, upon "Naval Hygiene." Very few of the profession appreciate the measures which are taken by the various branches of the government service to protect the inhabitants of the United States from disease, and all articles which can bring this subject to us in a forcible manner are worthy of being carefully considered. The fact that Dr. Rohé's book has passed into a second edition shows that it has been appreciated, and as he has taken pains to make the second edition much more thorough and has added a hundred pages to the volume, those who are interested in hygiene should certainly possess it.

THE DAUGHTER: HER HEALTH, EDUCATION, AND WEDLOCK. By WILLIAM M. CAPP, M.D., F.A. Philadelphia and London: F. A. Davis, 1890.

DR. CAPP has written a book which will doubtless be found useful by those physicians who think it advisable to place in the hands of patients information concerning the care of themselves or their children. The author, very properly, does not profess to do anything more than to direct the laity in that knowledge which is

so necessary for their welfare. Many of the more delicate subjects such as that of "Training for Married Life," the "Interruption of the Menstrual Function," and the "Relationship between the Sexes" are treated with very considerable skill and in a manner which could not strike anyone as being improper or bald. There is probably no period of a woman's life in which the possibilities for disordering natural functions are greater than they are about the age of puberty, and the absolute ignorance in which most young girls are allowed to exist, even until they attain adult life, is often productive of much misery, both mental and physical. Quite a number of the books which have been written by physicians for popular use have been prepared in such a way that the professional man can read between the lines strong bids for popular favor, or terms are employed which are so deep as to give no information or produce great alarm. These objectionable features will not be found in Dr. Capp's *brochure*, and for this reason it is worthy the confidence of physicians. Certain portions of the book seem to point to the fact that the author has been more alive to the importance of the subject than to the character of the English which he has employed; thus, on page 99, the typographical error which reads "nominal health," has been, by the use of a pen, changed to the words "normal health," the adjective (normal) being, of course, absolutely unnecessary.

A TREATISE ON THE DISEASES OF INFANCY AND CHILDHOOD. By J. LEWIS SMITH, M.D. Seventh edition, thoroughly revised. Illustrated. Philadelphia: Lea Brothers & Co., 1890.

To those who are interested in children's diseases the appearance of the seventh edition of Dr. Smith's classical work on this branch of medicine has given much pleasure, because it brings the book fully up to date and renders it even more than before worthy of universal recommendation to both students and practitioners. As the author points out in the preface, he has found it necessary to include for the first time the discussion of a number of diseases which hitherto were not considered by him. Prominent among these are epilepsy, appendicitis, typhilitis and perityphilitis, and an article on intubation, all of which subjects are of great importance and worthy of a place in so complete a text-book. Most of our readers are so well acquainted with Dr. Smith's book in former editions that to do more than direct attention to the seventh revision is unnecessary.

CORRESPONDENCE.

CHICAGO.

THE Chicago Polyclinic will commence its third semi-annual special course for practitioners March 30th. Among the lecturers are Drs. Fenger, Parkes, Belfield, Etheridge, and Senn.

That too great care cannot be exercised in writing prescriptions was well illustrated in the case of a prominent physician in this city who recently prescribed an overdose of laudanum for a twelve-weeks-old baby, the child dying in a few hours thereafter. It is said that the dose was large enough to kill three ordinary men.

The doctor was sued for \$5000, but the jury returned a verdict for \$500 damages. The case has attracted considerable attention from medical men and pharmacists. The doctor, discovering his mistake, called at the drug-store shortly afterward, and securing the prescription, changed it in order to make it appear that the medicines called for were harmless. This fact was brought out in the evidence given in the case.

The grand jury reported a few days since that, after visiting the Detention Hospital, they had found it, after careful investigation, to be clean and free from vermin. With regard to the Cook County Hospital, they had examined closely every department, particularly the food and the hygienic surroundings, and found them in good condition. The food was well cooked and of wholesome quality. The report states, also, that there are 400 patients at the county hospital, and all well cared for, both officers and attendants being kind and considerate in their treatment. The Asylum contains 1299 men, 425 women, 50 girls, and 45 boys. The building is kept scrupulously clean, and everything possible for the best interests of the patients is done.

RETROVERSION OF THE UTERUS, WITH THE BLADDER ADHERENT TO THE ABDOMINAL WALL.

To the Editor of THE MEDICAL NEWS,

SIR: The writer was called in consultation, on January 3, 1889, by Dr. Willoughby, of Buffalo, to see Mrs. McC., forty-one years of age, the mother of five children, the youngest being four years old. The history of the case, as given by Dr. Willoughby, was as follows: About a week before our consultation he was called, and found the patient suffering from headache, loss of appetite, nausea, pain in different parts of the body, insomnia, and difficulty in urinating. During the previous two or three days she had had a sanguinous discharge, although not so much as during her normal periods. She had not menstruated for three months, yet previously to that time her menstrual periods had been regular. Dr. Willoughby concluded that she was pregnant but threatened with a miscarriage, and treated her accordingly. The flow soon stopped, but the patient did not improve, and, upon a more thorough examination, he discovered, in addition to her other troubles, that she was suffering from cystitis and that the fundus of the retroverted uterus was low in the hollow of the sacrum, the os being high behind the pubic arch; also, that she passed but little urine and this with great difficulty. It was found necessary to introduce a rubber male catheter the full length of the instrument to empty the bladder. Thinking that the retroverted uterus pushed the bladder up out of position, thus increasing the difficulty in urinating and also aggravating the cystitis, an effort was made to replace that organ, but without success.

On the next day I was called, and found the patient in bed. Her expression was somewhat anxious, pulse rapid, and temperature 101° F. There were slight abdominal pain and tenderness, and no appetite, and her bowels were constipated. After a thorough examination I fully concurred with Dr. Willoughby in his diagnosis. As

we both thought it advisable to replace the uterus, if possible, the patient was put in the knee-chest position. The vulva and vagina being capacious, I could introduce my hand and grasp the uterus, yet, after persistent effort, was unable to restore the organ to its normal position, or even to move it, and the attempt had to be given up. The patient experienced no ill-effects from the manipulation, but she gradually sank, and died a week later. An autopsy was made by Dr. Willoughby in the presence of Dr. Cronyn and the writer, eighteen hours after the patient's death. Upon making an incision through the abdominal wall, the bladder, which was partly filled with urine, was opened, owing to the fact that its whole anterior wall was closely adherent to the abdominal wall over a nearly circular area six or seven inches in diameter, the upper border of the adhesion being two inches or more above the umbilicus. The adhesions were quite firm, requiring considerable force to separate them. The posterior wall of the bladder was adherent to the uterus for a short distance, and there were two or three points of adhesion between the anterior and posterior walls of that organ. The fundus of the retroverted uterus was situated low in the hollow of the sacrum, and contained a normal fetus of about three and a half months development. The liver and kidneys were engorged with blood, but the other abdominal organs were healthy.

The point to which I wish to call attention is the firm, extensive, and high adhesions of the bladder to the abdominal wall. In my experience this is an unusual complication, yet it readily explains why the retroverted uterus could not be replaced.

HENRY D. INGRAHAM, M.D.

405 FRANKLIN STREET, BUFFALO, N. Y.

BELLADONNA FOR STRANGULATED HERNIA.

To the Editor of THE MEDICAL NEWS,

SIR: In your issue of January 31st, under "Medical Progress," you quote from an article of Hayem in the *Centralblatt für Chirurgie*, on "The Treatment of Strangulated Hernia by Belladonna and Atropine."

I write to say that since 1865 I have used the Unguentum Belladonnæ, of the U. S. Pharmacopœia, as an inunction to the tumor in cases of strangulated hernia, to facilitate the taxis of the contents of the hernia, and always with success.

I reported the method to several medical societies, and it has been used successfully by some of my former students. Yours truly,

FANEUIL D. WEISSE, M.D.

New York, February 26, 1891.

DIGESTION, ASSIMILATION, AND OXIDATION.

To the Editor of THE MEDICAL NEWS,

SIR: In reply to the criticism by George L. Amerman, in THE MEDICAL NEWS of February 28, 1891, for which I am very thankful, permit me to say that one of the sentences to which he refers should read as follows, to make my meaning clear: "This action is effected" *not* "only" in an "alkaline solution," but also "in an acid medium the percentage-acidity of which has not exceeded ten per cent." This, I think, would also imply

action in a neutral medium, possibly developed in the stomach, between the entrance of the salivary fluid from the mouth and the final arrest of the action of the ptyalin by the supra-acid fluid developed within the gastric cavity. I did not lay much stress upon the fermentative action in a neutral medium, because of the little proof that such a reaction is developed and maintained for any considerable length of time in the stomach during the natural processes of digestion.

In the experimental laboratory no one can deny a given result, but evidence obtained in a glass test-tube, or as the result of experimental work upon the lower animals, is not always positive proof of an identical action in the laboratory of the human system.

No one can appreciate more highly than I the evidence obtained in the laboratory, but it will not always correspond with clinical results, because the conditions are not absolutely the same, and in all cases due allowance must be made on both sides if the maximum amount of knowledge is to be attained.

Second: In reference to the terms *non-nutritious* and *nutritious*, as applied to the two classes, CHO and CHNOS compounds. Until the chemist has clearly proved that the chemico-physiological laboratory of the animal economy is capable of taking a simple CHO element, and joining free nitrogen to it, and thus developing within the system a proteid substance, it seems to me proper to retain and follow this classification, as it so closely defines our meaning. The terms "*essential*" and "*accessory*," used by Mr. Huxley, practically mean about the same thing, but they are much less explanatory, and cannot be used with such force, where we apply these laws in the development of diseased conditions as I frequently do in my lectures.

Third: In reference to "the nitrogenous envelope surrounding the starch granule." This is unquestionably misleading, and I am glad of the opportunity for correcting the misapprehension. A glance, however, at Table VI., in Lecture III., will show that cellulose is not credited with containing nitrogen, but is rated as a purely CHO element. So that the statement refers to the starch-bearing substance as a whole, and not to purified starch alone. The statement, to obviate all doubt, ought to have read thus: The nitrogenous or proteid part of the starch-bearing substance is digested by the peptic action in the stomach, thus setting free, as it were, the granulose and cellulose, which places the starch granule in a favorable position to imbibe water, to swell up, and in part liberate the granulose from the cellulose.

In regard to the "dogmatic" assertions as to what ferments are, I fully appreciate that, in a measure, what we say about them is largely theoretical, but until more positive information upon the subject is developed, it seems but wise to use these positive statements regarding terms that are in common use, like ptyalin, pepsin, etc. Because Foster says probably other bodies are active constituents, but fails to tell us what they are, why should we confuse our minds with a thousand and one things that may possibly be discovered in due time?

It was in the attempt to base practical medicine upon scientific fact that these lectures were written and delivered in this positive style, and just so soon as the physiological chemist will tell us positively which of the

probable ferments is to be the exact starch-transforming substance, and get it so placed or arranged that it will correspond with clinical observations, it will be accepted at once, and I am sure that my fellow-students in this great field will gladly welcome this more definite information.

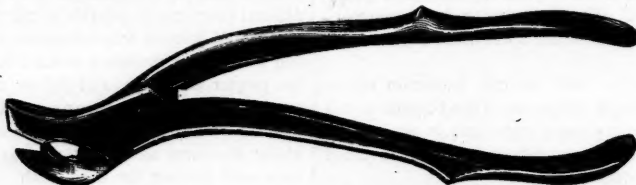
WILLIAM HENRY PORTER, M.D.

NEW INSTRUMENTS.

SPINAL RONGEUR FORCEPS.

BY WILLIAM BARTON HOPKINS, M.D.,
OF PHILADELPHIA.

THE forceps here exhibited are designed to open the spinal canal midway between the spinous and transverse processes. The instrument consists of an upper cutting blade and a lower jaw which acts as a counter, as in the cranial rongeur forceps devised by the writer some years ago. The upper blade has upon its lower margin a double cutting edge an eighth of an inch wide, and is fenestrated with an opening larger at the top than below, to allow of the free egress of chips. The lower blade enters between the edges of the upper a sixteenth



of an inch, and will therefore cleanly incise dense fibrous tissue as well as bone. The lower jaw has a gradual bevel from before backward in order that it may follow in its track without binding; a shoulder at its heel acts as a gauge to indicate the depth it occupies in the bone. The whole instrument has an S-shaped curve that it may be more readily manipulated in the bottom of deep wounds, but care has been taken to preserve the parallel between the axis of the blades and that of the handles. The handles are made with stops to give good purchase in thrusting the instrument forward. The requirements which it has been sought to fulfil with this instrument are, first, to enter the continuity of the spine and divide the laminae with a single instrument; second, to make a clean narrow bone-wound which can be approximated if desired; third, to lay bare an extensive portion of the cord with rapidity and without risk of injury to it or its membranes. "Experimenting upon the cadaver they are found to enter the spine at any point (cutting always from below upward) with great ease, and with them sixteen laminae at the dorsal spine were cut away, exposing the cord in eight vertebrae, in seven minutes." Though intended particularly for the spine, its probable adaptability for craniectomy has not been lost sight of.

1904 S. RITTENHOUSE SQUARE.

NEWS ITEMS.

State Board of Medical Examiners and Licensers.—The following resolution is self-explanatory:

Resolved, That the Faculty of the Woman's Medical

College of Pennsylvania approves of the present bill of Hon. Frank M. Ritter to establish a State Board of Medical Examiners and Licensers.

CLARA MARSHALL,
Dean.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM MARCH 3 TO MARCH 9, 1891.

By direction of the Secretary of War, leave of absence for two months, on surgeon's certificate of disability, is granted SAMUEL HORTON, *Major and Surgeon*.—Par. 7, S. O. 49, A. G. O., Washington, D. C., February 4, 1891.

By direction of the Secretary of War, HENRY LIPPINCOTT, *Major and Surgeon*, is relieved from duty at Fort Union, New Mexico, to take effect upon the final abandonment of that post, and will then proceed to Fort Adams, Rhode Island, and report in person to the commanding officer of that post, for duty as Post Surgeon, reporting by letter to the commanding general Division of the Atlantic.—Par. 9, S. O. 46, A. G. O., Washington, D. C., February 28, 1891.

By direction of the Secretary of War, the extension of the leave of absence granted WILLIAM B. DAVIS, *Captain and Assistant Surgeon*, in Special Orders No. 22, February 5, 1891, Division of the Atlantic, is further extended one month.—Par. 7, S. O. 21, A. G. O., Washington, D. C., February 28, 1891.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING MARCH 7, 1891.

RUTH, M. L., *Surgeon*.—Granted one month's sick-leave. *NEW*
EVANS, S. G., *Assistant Surgeon*.—Detached from the Naval Academy, and ordered to the "Monongahela."

PRICE, A. F., *Surgeon*.—Ordered to the U. S. S. "Monongahela."

HARRIS, H. N. T., *Assistant Surgeon*.—Ordered for examination preliminary to promotion.

PICKERELL, GEORGE MCC., *Assistant Surgeon*.—Ordered for examination preliminary to promotion.

AUZAL, ERNEST W., *Passed Assistant Surgeon*.—Ordered to the U. S. S. "Lancaster."

NORTH, JOSEPH H., Jr., *Assistant Surgeon*.—Ordered to the U. S. S. "Lancaster."

GAINES, JAMES H., *Surgeon*.—Ordered before the Retiring Board, March 12th.

OFFICIAL LIST OF CHANGES OF STATIONS AND DUTIES OF MEDICAL OFFICERS OF THE U. S. MARINE-HOSPITAL SERVICE, FOR THE FIVE WEEKS ENDING FEBRUARY 28, 1891.

PETTUS, W. J., *Passed Assistant Surgeon*.—Relieved from special duty as Inspector of Immigrants at the Port of Boston. Ordered to the Marine Hospital, Boston, February 10, 1891.

PERRY, T. B., *Assistant Surgeon*.—Granted leave of absence for thirty days, February 20, 1891.

GOODWIN, H. T., *Assistant Surgeon*.—Relieved from duty at Cincinnati, Ohio. Ordered to Marine Hospital, New York, February 9, 1891.

COFER, S. E., *Assistant Surgeon*.—Detailed for special duty as Inspector of Immigrants, Port of Boston, February 10, 1891.

EAGER, J. M., *Assistant Surgeon*.—Assigned to temporary duty at Cincinnati, Ohio, February 20, 1891.

APPOINTMENT.

EAGER, JOHN M., of Pennsylvania.—Commissioned as Assistant Surgeon by the President, February 16, 1891.